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NAVAL SURFACE WEAPONS CENTER DAHLGREN VA
EFFECT OF SATELLITE ORBIT ERROR ON COMPUTED COORDINATES OF DOPP--ETC(U)
APR 82 R J ANDERLE
NSWC/TR-82-143

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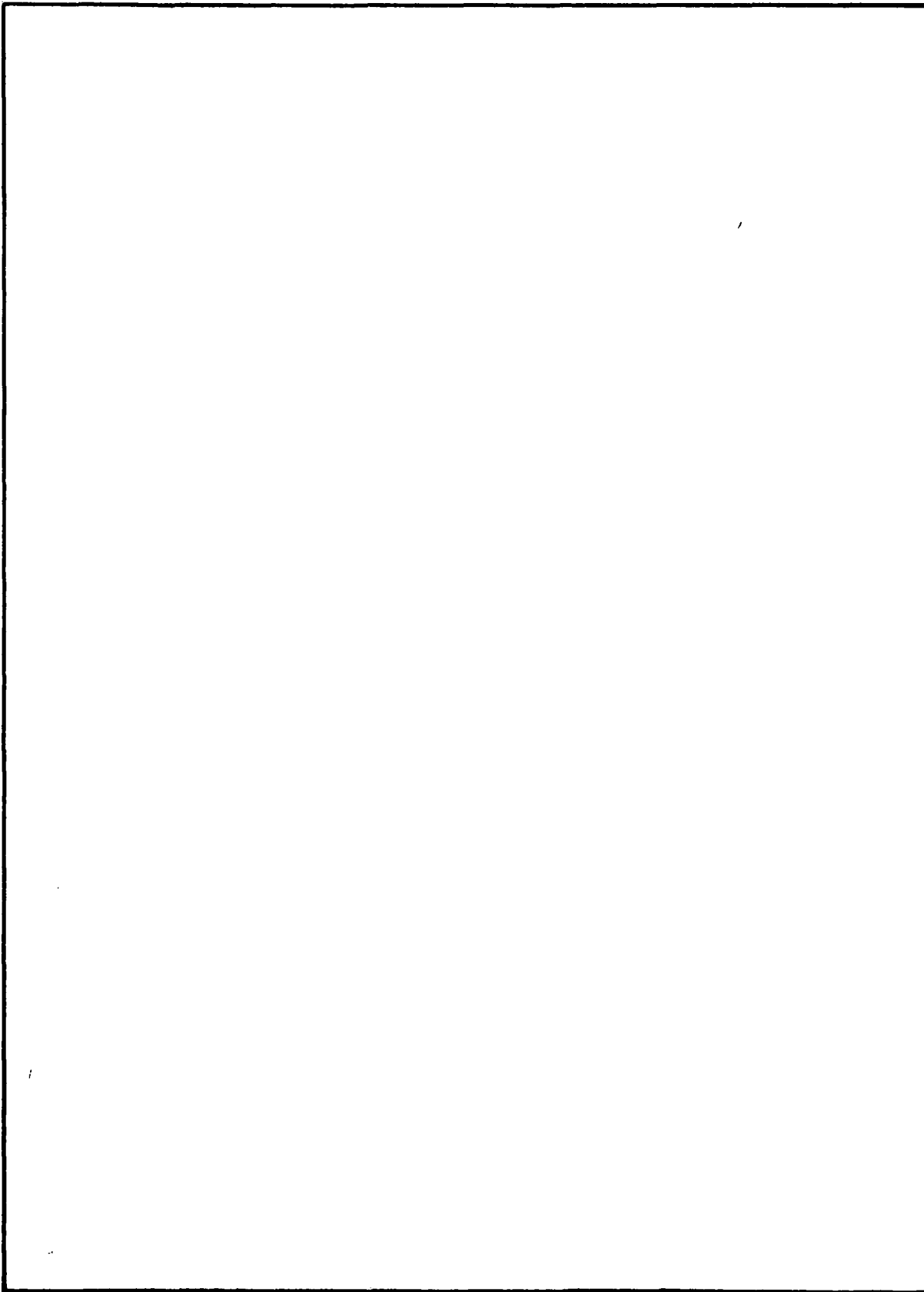
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FOREWORD

Positions of stations making Doppler observations of Navy Navigation Satellites are computed using predicted ephemerides broadcast by the satellites or using precise ephemerides computed in post analysis of data. When the broadcast ephemeris is used, it is customary to include a model of the ephemeris error in station position computations. Consideration of the ephemeris error, which can vary from pass to pass, is expected to improve the accuracy of station positions, particularly when the satellite is in view of two or more stations simultaneously. In contrast, precise ephemerides were originally used in 1963 to determine the positions of isolated sites. Although computations are currently performed for sites in close proximity, a systematic study has never been conducted to determine whether consideration of the error in the precise ephemeris would improve the accuracy of computations. This report compares the consistency of solutions for the relative locations of sites for various models of the error in the precise ephemeris.

The precise ephemerides used in this study were provided by the Defense Mapping Agency Hydrographic Topographic Center. Normal equations for station coordinates for each satellite pass over each station were computed by Teck Judd under the direction of C. A. Malyevac at the Naval Surface Weapons Center, were filtered to detect bad observations and provided for use in this study.

Released by:

C. A. Fisher

C. A. FISHER, Head
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- B - Graphs of Standard Deviations of Relative Station Coordinates
- C - Tables of Standard Deviations of Relative Station Coordinates
- D - Samples of Numbers of Passes Observed

INTRODUCTION

Ephemerides for Navy Navigation satellites are computed by the Naval Astronautics Group on the basis of four observing stations, predicted for 12 to 24 hours in the future, injected into the memory of each satellite, and rebroadcast by the satellite in real time. These "broadcast" ephemerides, which have an accuracy of 10-30 m, are widely used both for real time navigation of ships and for the calculation of geodetic positions of fixed sites. In geodetic calculations, the error in the satellite orbit is usually modelled in some manner to reduce its effect on the computed positions of receivers. The modelling of the orbit error can be expected to be particularly effective if the satellite is observed by two or more receivers and the coordinates of one or more of the receivers are known. The modelling can also be expected to be effective in reducing the error in the computed relative coordinates of receivers, even if there is no knowledge of the positions of any of the receivers.

Ephemerides of two or more Navy Navigation satellites are also computed by the Defense Mapping Agency Hydrographic Topographic Center on the bases of observations made by 20 to 40 receivers deployed globally. These "precise" ephemerides are computed after the fact and have an estimated accuracy of 2 m in the coordinate system defined by the observing networks (Anderle, 1976). Such ephemerides have been used to determine the positions of receivers since 1963 using procedures developed by the Naval Surface Weapons Center. In the original applications, the receivers being positioned were usually at fairly remote locations with respect to the base stations used in computing the precise ephemerides. Under these circumstances, it had been found that consideration of the error in the precise ephemeris was ineffective in determining the positions of the isolated sites. Computation of coordinates of sites while ignoring the error in the ephemeris, which is referred to as "point positioning", is still done widely by agencies using the precise ephemeris and is done exclusively at the Naval Surface Weapons Center. However the base station network is now considerably denser than it was 20 years ago and "remote" sites are now often relatively close to base stations. The objective of the study described in this report was to determine if consideration of the error in the precise ephemeris would reduce the error in the computed coordinates of sites.

PROCEDURE

The precise earth fixed ephemeris computed by the Defense Mapping Agency Hydrographic Topographic Center is routinely used by the Naval Surface Weapons Center to determine the positions of the base stations which had been used in determining the ephemeris. These computations are made for the purpose of monitoring the stability of the coordinate system in which positions of portable receivers are computed. In the course of these computations, the normal equations for station position for each satellite pass are stored in a library. The equations, $B^1 \Delta P = E^1$, have been adjusted to reflect the

elimination of a frequency parameter for each pass and for a refraction scaling parameter with an uncertainty of 10% in the a-priori refraction:

$$B^1 = B - A^*[B_b + \begin{pmatrix} 0 & 0 \\ 0 & 100 \end{pmatrix}]^{-1}A$$

$$E^1 = E - A^*[B_b + \begin{pmatrix} 0 & 0 \\ 0 & 100 \end{pmatrix}]^{-1}E_b$$

where B and E are the partitions of the normal equations for station position
 B_b and E_b are the partitions of the normal equations for bias parameters
A, and its transpose A^* , is the partition of the normal matrix correlating position and bias
and "100" is the weight for the a-priori refraction scaling parameter.

Normal equations for days 173-233, 1981 for satellite 197067A (DMA satellite 68, NAVASTROGROUP satellite 30190, Space Defense Center satellite 4507) were arbitrarily selected for the study discussed in this report. The equations had already been tested to eliminate outliers in point position solutions made at five day intervals.

The normal equations for station coordinates for each pass were expanded to include six parameters for the ephemeris of the satellite. The six parameters were coefficients of periodic (orbit period) variations of the coordinates of the satellite. The expanded normal equations were combined for five day intervals to obtain twelve solutions for each station for each of six cases identified as follows on graphs and tables given in this report:

1. Point Positions/Orbit Fixed
2. Point Positions/Orbit Relaxed
3. Semi-Short Arc/30 Deg. Max. Gap
4. Semi-Short Arc/90 Deg. Max. Gap
5. Semi-Short Arc/90 Deg. 6 Parameters
6. Semi-Short Arc/One Rev. Fit

For the first case, which corresponds to the normal computations at the Naval Surface Weapons Center, the orbit parameters were suppressed. For the point positions with orbit relaxed, the six parameters were reduced to three parameters representing a translation of the orbit in the three coordinate directions, where the a-priori orbit was weighted on the assumption that it was accurate to 1 m in each coordinate. In the semi-short arc with a 30 degree maximum gap, the same model for the orbit error was assumed, but the orbit error was assumed to be common for a group of stations so long as the times of closest approach between some pair of stations did not exceed the equivalent of 30 degrees change in satellite latitude. The semi-short arc with 90 degree gap differed from case 3 only in the tolerance defining a station group. The 90 degree tolerance, however, frequently extended the station net to a full revolution of the satellite; under such conditions, the representation of the orbit error as a translation is not reasonable. Therefore case 5 included the six parameter orbit representation discussed at the start of this paragraph, where each coefficient of the periodic functions was assigned a weight corresponding to 1 m. The final case included the same six parameter

representation, but the short arcs extended from one crossing of the south pole to the next crossing of the south pole.

The means and standard deviations of each coordinate of each station were computed, and solutions were discarded for a given case if a solution for any coordinate of a station differed from the mean coordinate by more than 2.5 times the standard deviation. The mean and standard deviation of the coordinates of the remaining solutions were then computed along with the mean difference and standard deviation of the difference in each coordinate of each pair of stations. The standard deviations of the coordinates and differences in coordinates were then studied to determine whether one of the orbit models defined by the six cases produced solutions which were more consistent than any other model.

DISCUSSION OF RESULTS

The one meter uncertainty assigned to the orbit is equivalent to a higher actual orbit uncertainty because the effectiveness of the orbit constraint depends on the uncertainty assigned to the original observations and to the a-priori refraction parameter. To estimate the actual orbit accuracy equivalent to the assigned uncertainty, the rms of orbit displacements was computed for the first 30 passes in the solutions point position/orbit relaxed. The rms values were 1.3, 1.5, and 1.5 meters in the x, y and z components, respectively.

The standard deviations for each coordinate of each station are plotted in Appendix A for each orbit model versus station longitude. The station latitude is shown by the plotting symbol. The graphs show a tendency toward an increase in error in station position for the models with orbit relaxation with respect to the point position/orbit fixed solutions. The solutions for the relative coordinates of the stations are plotted in Appendix B as a function of modified longitude difference between stations. The values are also tabulated in Appendix C. The actual longitude difference between the stations was multiplied by the cosine of the latitude of the station closest to the pole to reflect the fact that passing a station at a given longitude difference pass closer to stations at extreme latitudes than to stations at moderate latitudes. The central angle between each pair of stations is shown next to each plotting symbol and a curve is plotted through the standard deviations in coordinates of stations separated by less than 45 degrees central angle as well as through those of stations separated by more than 45 degrees. The various cases can be compared more easily in figures 1A-1C and 2A-2C, which show only the curves through the rms values for the two classes of separation in central angles for each coordinate. Case 1, point positions/orbit relaxed gave the best over-all results followed by case 1, point position/orbit fixed.

The many solutions plotted and tabulated are dominated by station pairs which had very few common passes due to station separation and data losses in filtering so that the potential benefits of common orbit parameters

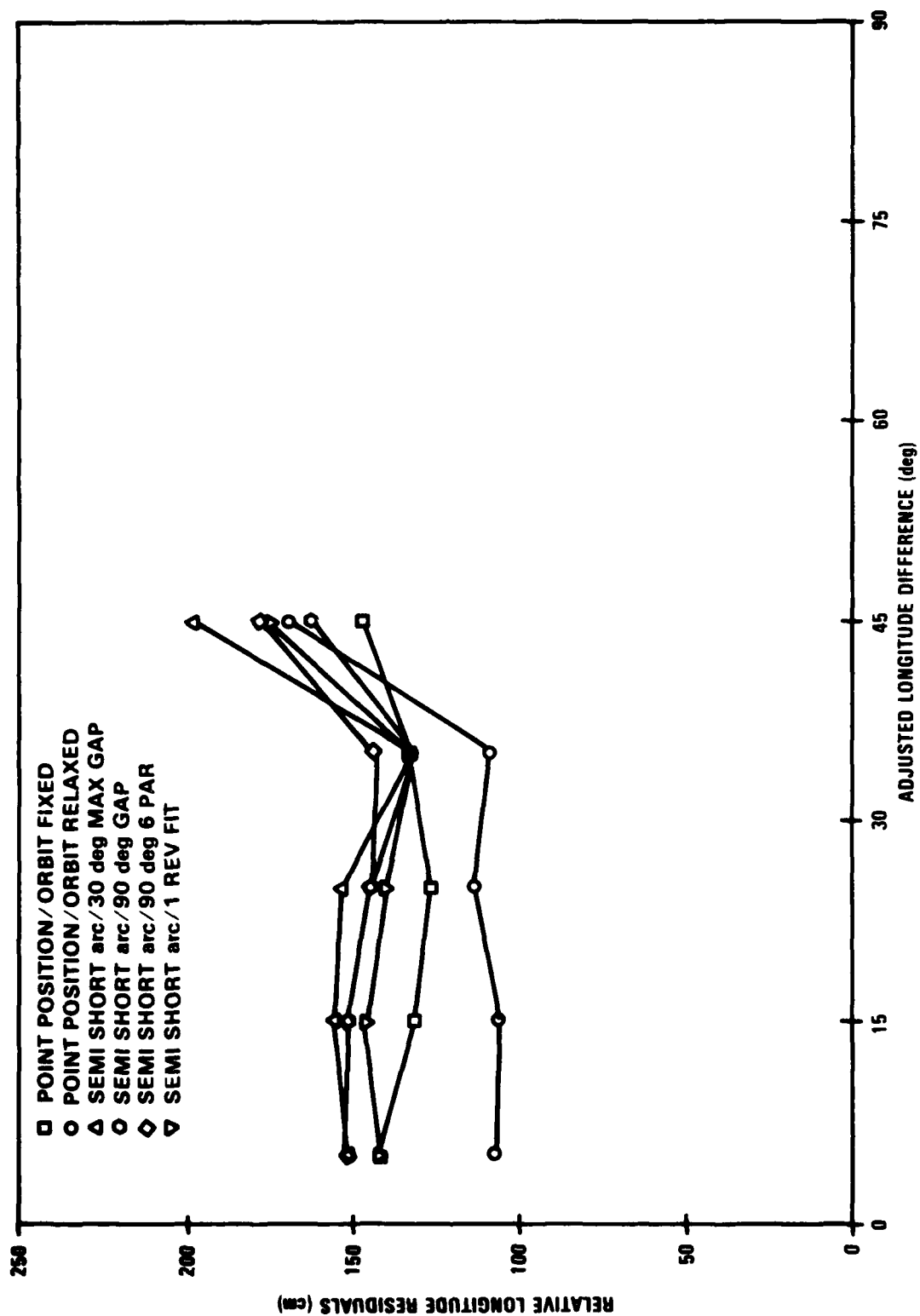


Figure 1A. Relative Longitude Residuals: Central Angle Less Than 45 Degrees

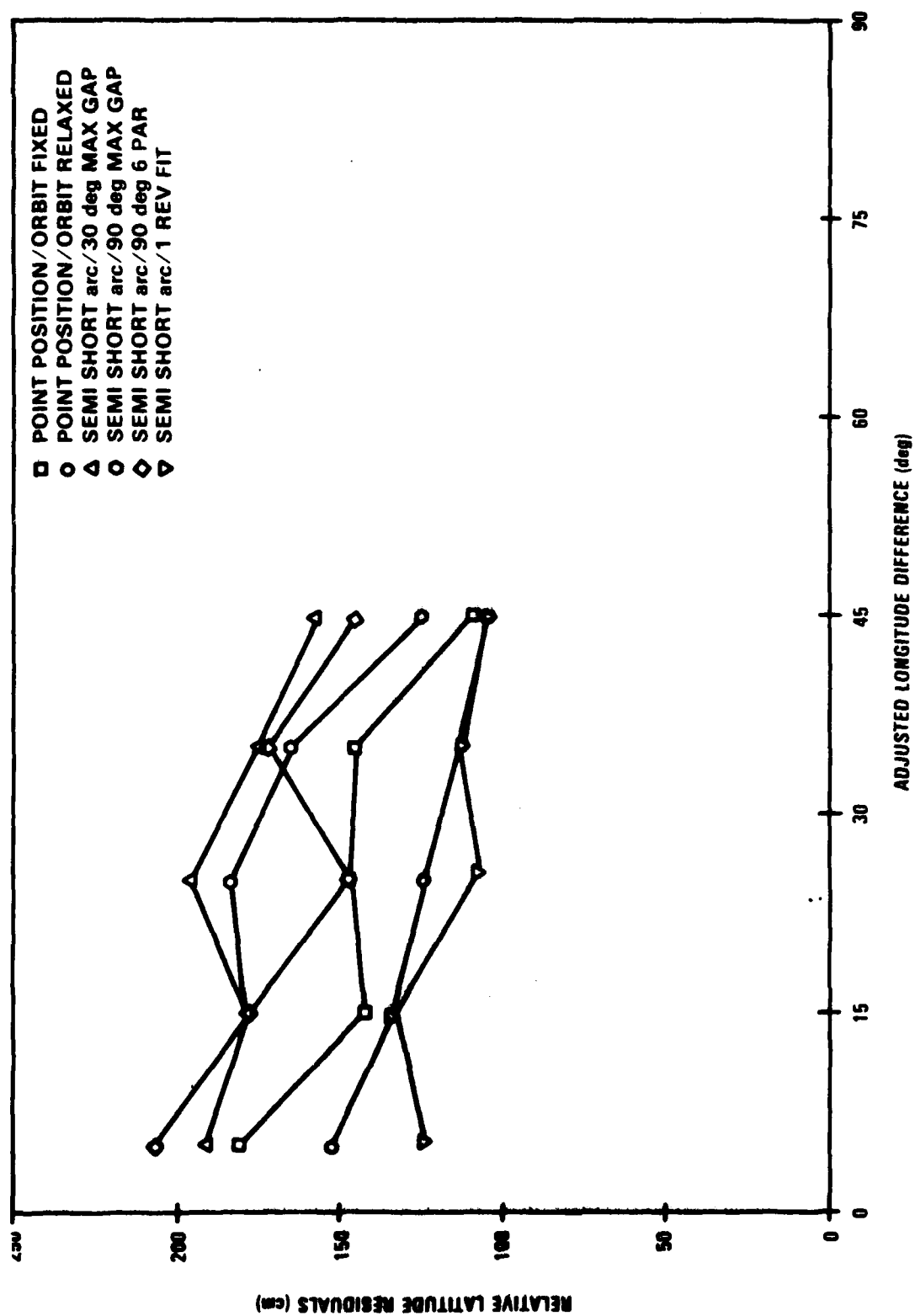


Figure 1B. Relative Latitude Residuals: Central Angle Less Than 45 Degrees

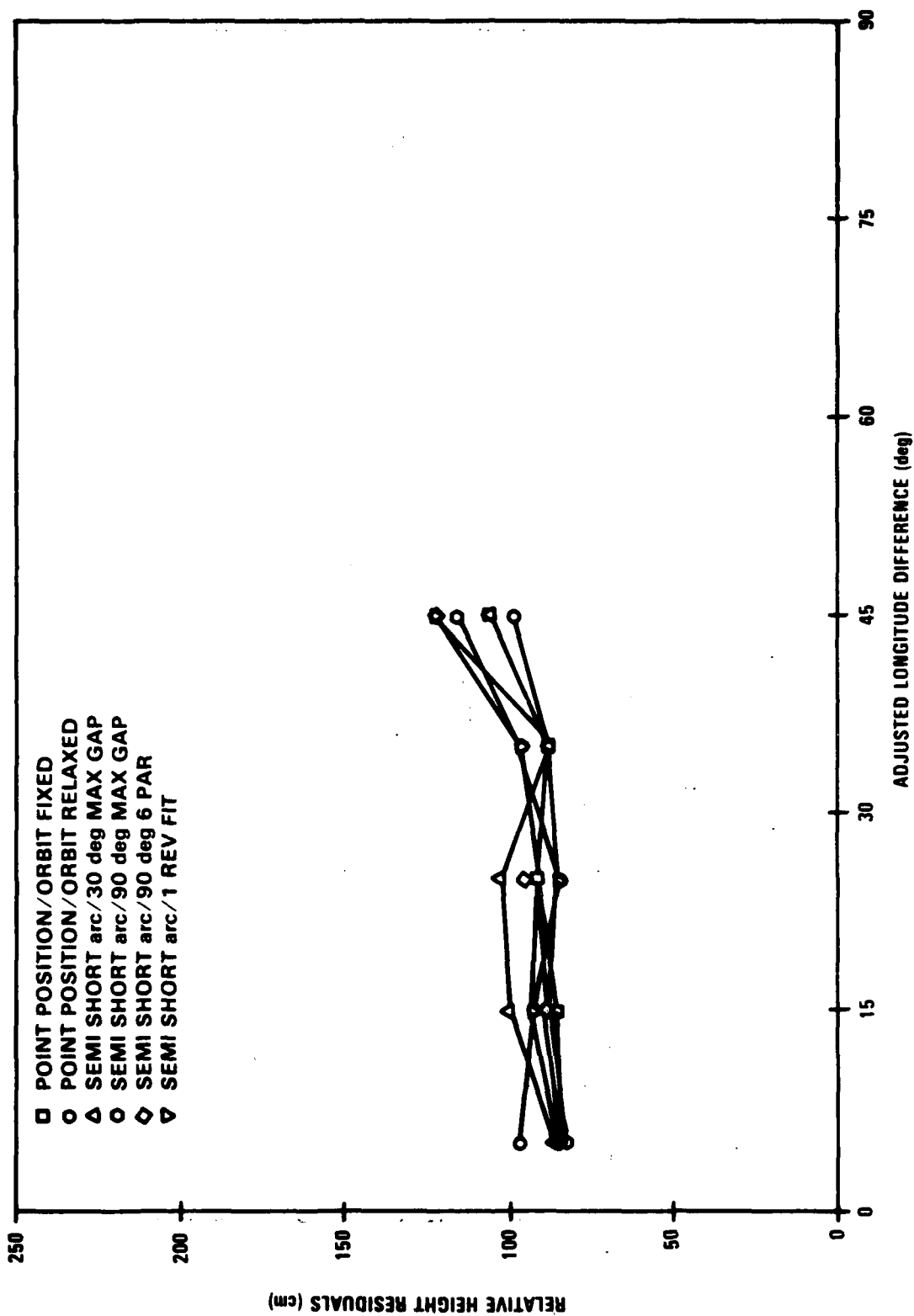


Figure 1C. Relative Height Residuals: Central Angle Less Than 45 Degrees

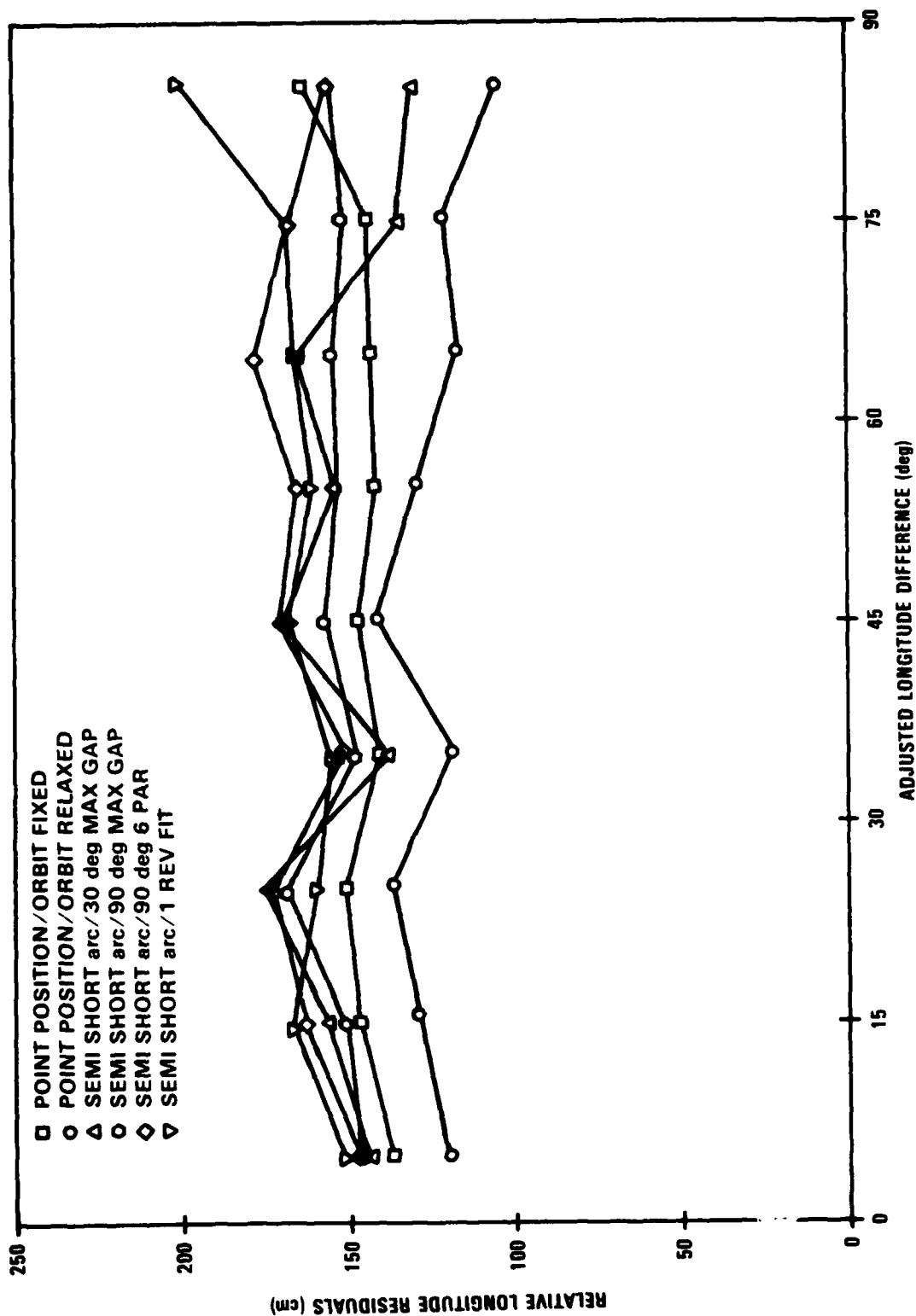


Figure 2A. Relative Longitude Residuals: Central Angle Greater Than 45 Degrees

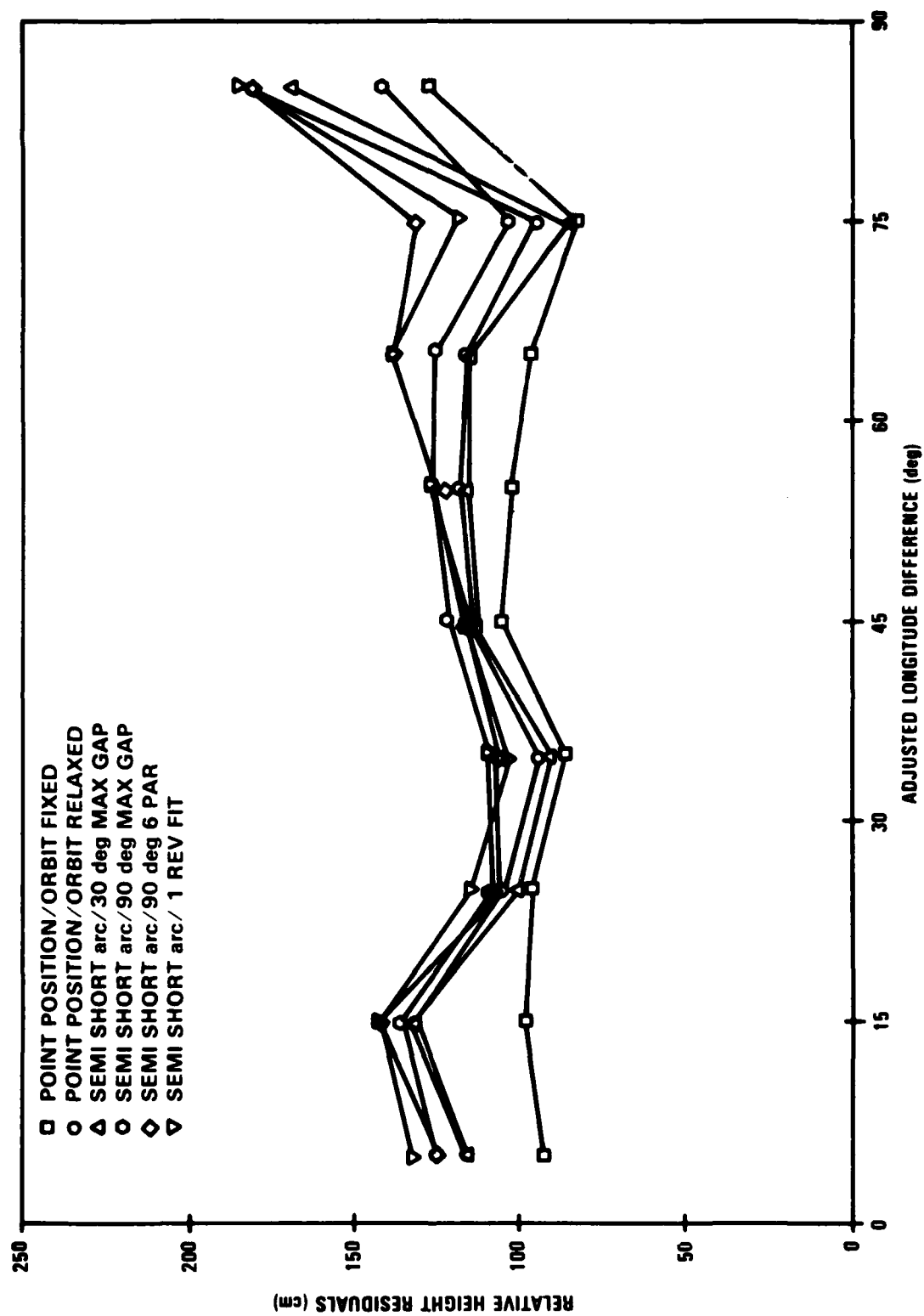


Figure 2B. Relative Latitude Residuals: Central Angle Greater Than 45 Degrees

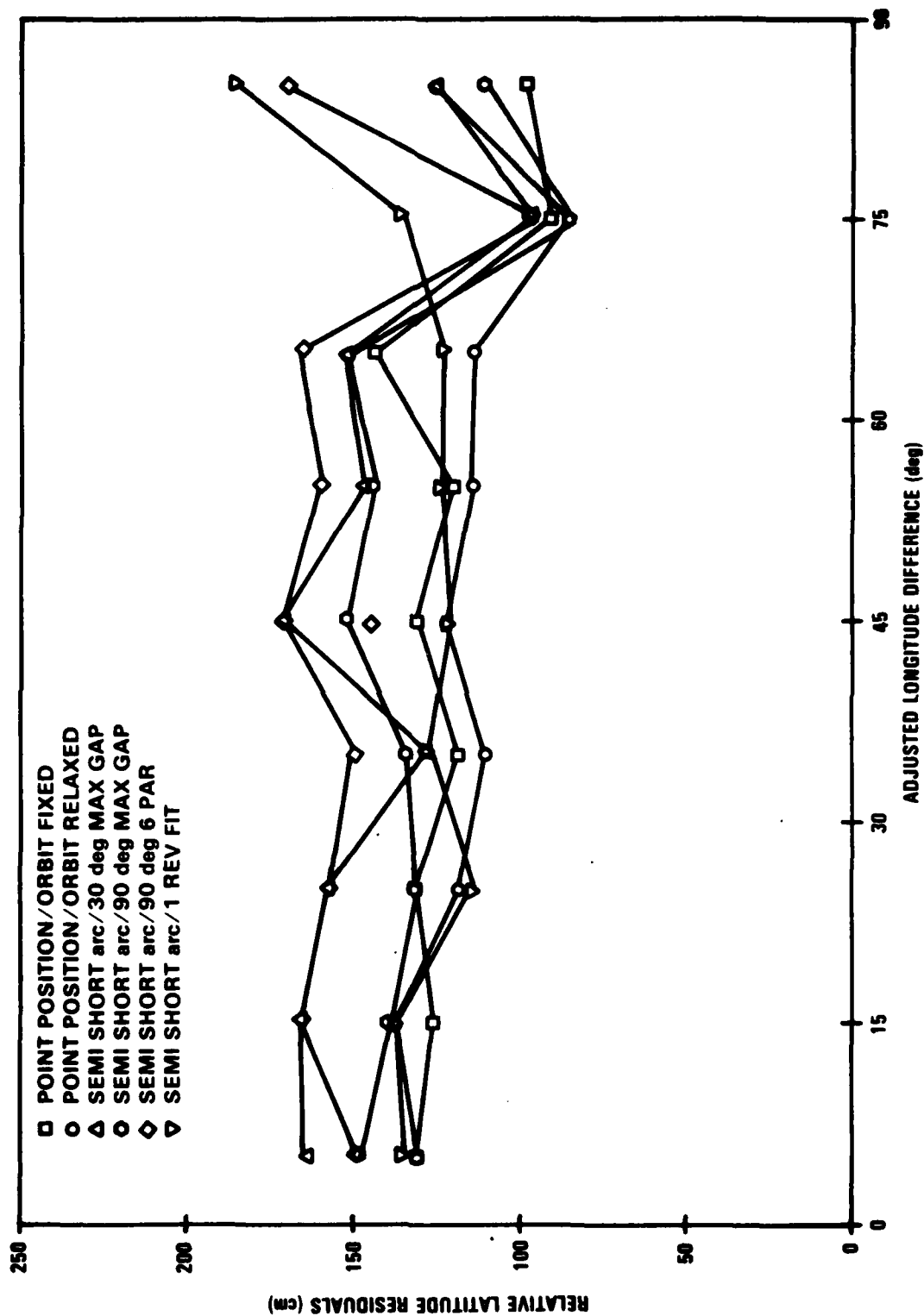


Figure 2C. Relative Height Residuals: Central Angle Greater Than 45 Degrees

for a station net are clouded. Appendix D shows the number of passes observed by each station along the diagonals of the arrays and the number of common passes in the off-diagonal positions for a few sample solutions. Eight station pairs were selected for further study from among the pairs with higher numbers of common passes. The station pairs selected were:

310 (Maine)/320 (Minnesota)
 128 (Ottawa)/310 (Maine)
 107 (Virginia)/30682 (Virginia, colocated)
 128 (Ottawa)/107 (Virginia)
 116 (England)/21 (Belgium)
 310 (Maine)/107 (Virginia)
 192 (Texas)/320 (Minnesota)
 23 (Guam)/27 (Japan)

Compared with the orbit fixed case, the relative coordinates for the orbit relaxed cases differed as follows for these eight station pairs:

Case	No. of Coordinates	No. of Coordinates
	Better	Worse
2. Point Position/orbit relaxed	11	13
3. Semi Short Arc/30 deg Max Gap	9	14
4. Semi Short Arc/90 deg Max Gap	12	10
5. Semi Short Arc/90 deg 6 Par.	11	12
6. Semi Short Arc/One Rev.	11	12

The absolute coordinates compare as follows:

Case	Better	Worse
2	13	17
3	8	22
4	12	18
5	11	19
6	14	16

For these eight station pairs, some of the models which considered the error in orbit performed about as well as the orbit fixed case, but none were clearly superior. There seemed to be some tendency for the models which considered orbit error to increase the standard deviations of the stations which had the smallest error in the orbit fixed case and to decrease the error for the stations which had larger scatter in the orbit fixed solutions.

The lack of a significant improvement in the results when the orbit error is considered to be common to a group of stations is presumed to be due to the fact that the error in the data on a given satellite pass is generally as large as the error in the precise ephemeris computed on the basis of 100 or more passes. This result was postulated heuristically by Jack Weightman (private communication). Although most of the stations which provided data analyzed in this report were equipped with Rubidium or Cesium oscillators, the oscillators are not tuned for maximum performance at the critical averaging time of about 1000 seconds. Simulations (Spence, 1981; Colquitt and Anderle, 1979) show that oscillator error can degrade

station performance to the 1 m level. The study should be performed again when stations are equipped with oscillators which are known to have an adequate performance level. In addition, the separation of the stations used in this test was relatively large, and the density of stations grouped in any given orbit solution was relatively light. The results may not be applicable to a larger group of more densely distributed stations.

CONCLUSIONS

Consideration of an error in the precise ephemeris common to a group of stations provides no significant benefit in improving the consistency of absolute or relative positions of the base stations used in determining the ephemeris for the observing equipment in use in 1981. This conclusion is not necessarily valid for more densely spaced stations. Some improvement was noted when point positions were computed independently for each station with relaxation of the ephemeris accuracy.

RECOMMENDATION

This study should be performed again when stations are equipped with oscillators with a known and adequate level of performance.

REFERENCES

- Anderle, R. J., "Error model for geodetic positions derived from Doppler satellite observations", Bulletin Geodesique 50(1), 43-77, 1976.
- Colquitt, E. S. and Richard J. Anderle, "Effect of Oscillator Performance on Doppler Geodesy", Proceedings of the Second International Geodetic Symposium on Satellite Doppler Positioning, University of Texas at Austin, 409-422, 1979.
- Gouldman, M. Wendel Spence, "Oscillator Studies", Proceedings of the Third International Geodetic Symposium on Satellite Doppler Positioning, New Mexico State University, in press.

APPENDIX A

STANDARD DEVIATIONS OF ABSOLUTE
STATION COORDINATES

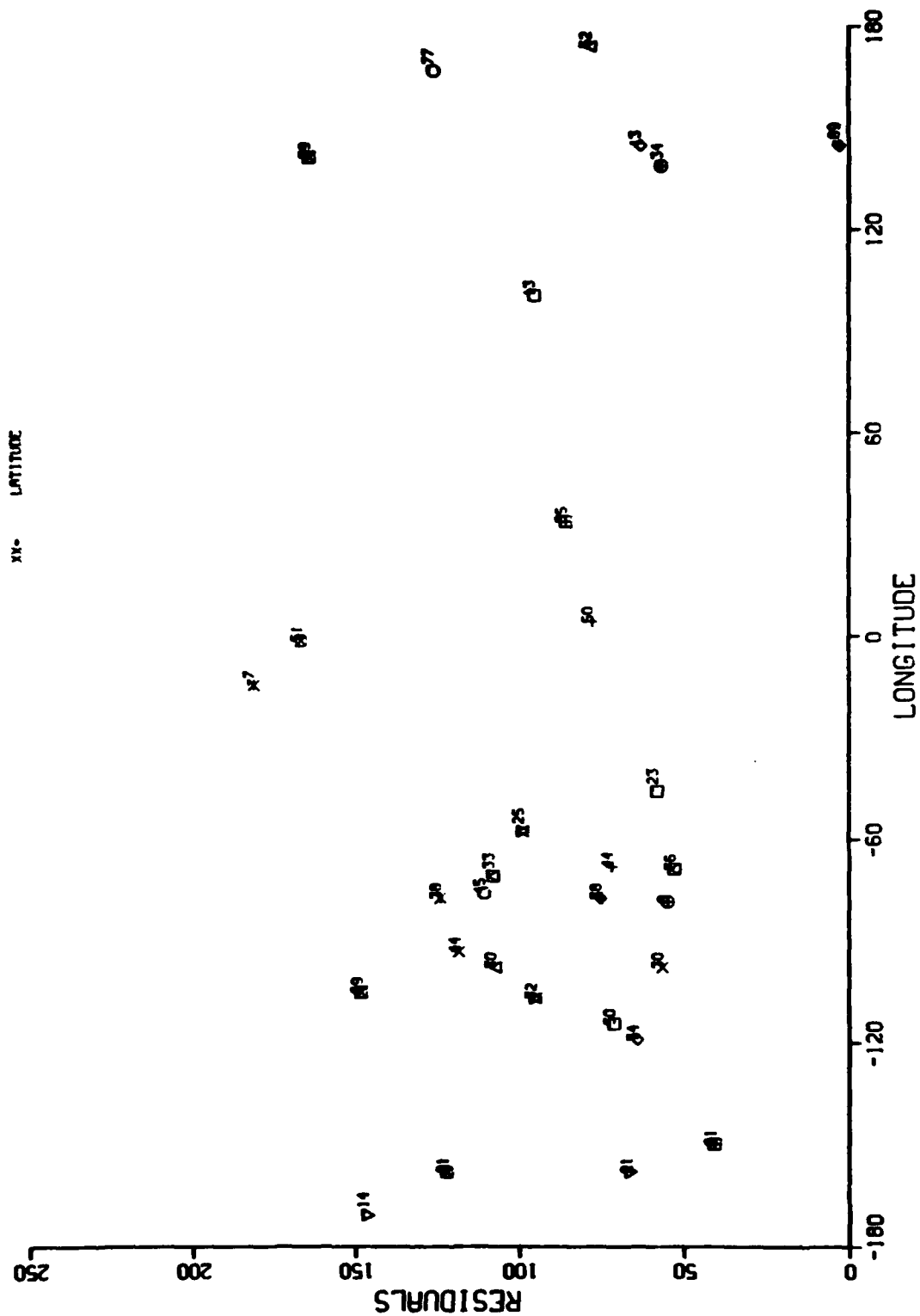
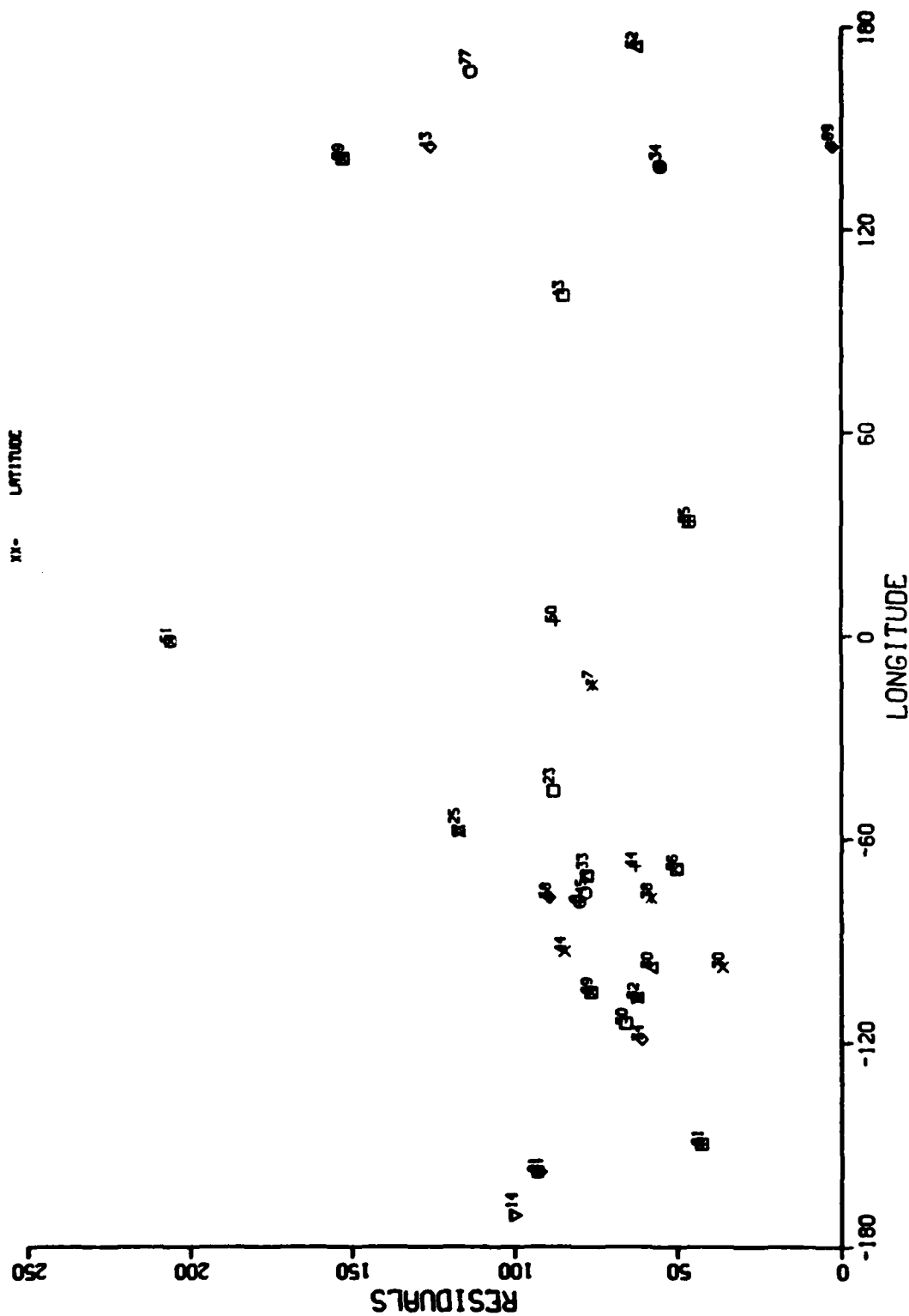


Figure 3A. Absolute Longitude Solutions (CM)

Point Position/Orbit Fixed



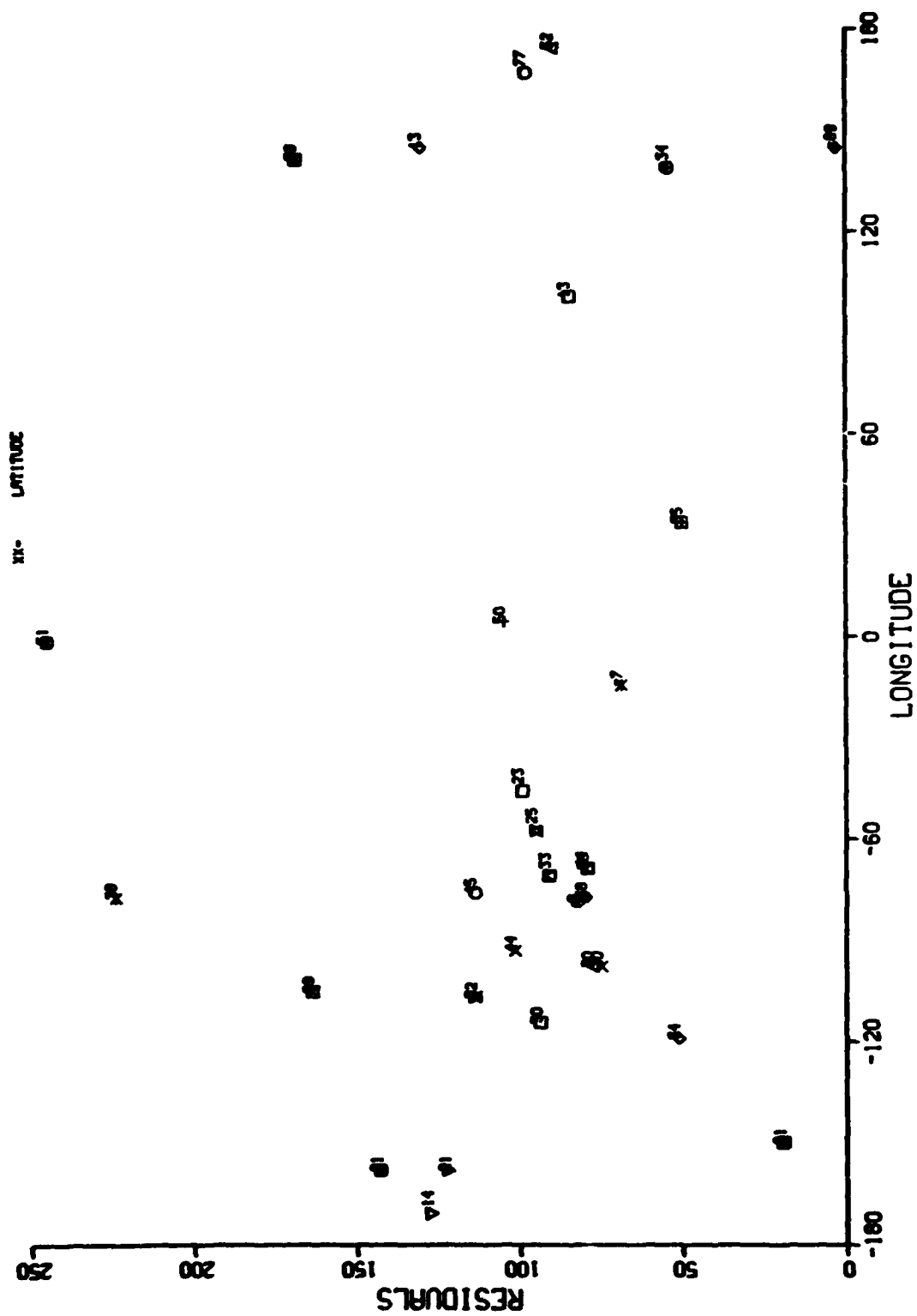


Figure 3C. Absolute Longitude Solutions(CM). Semi Short Arc//30 Deg Max Gap

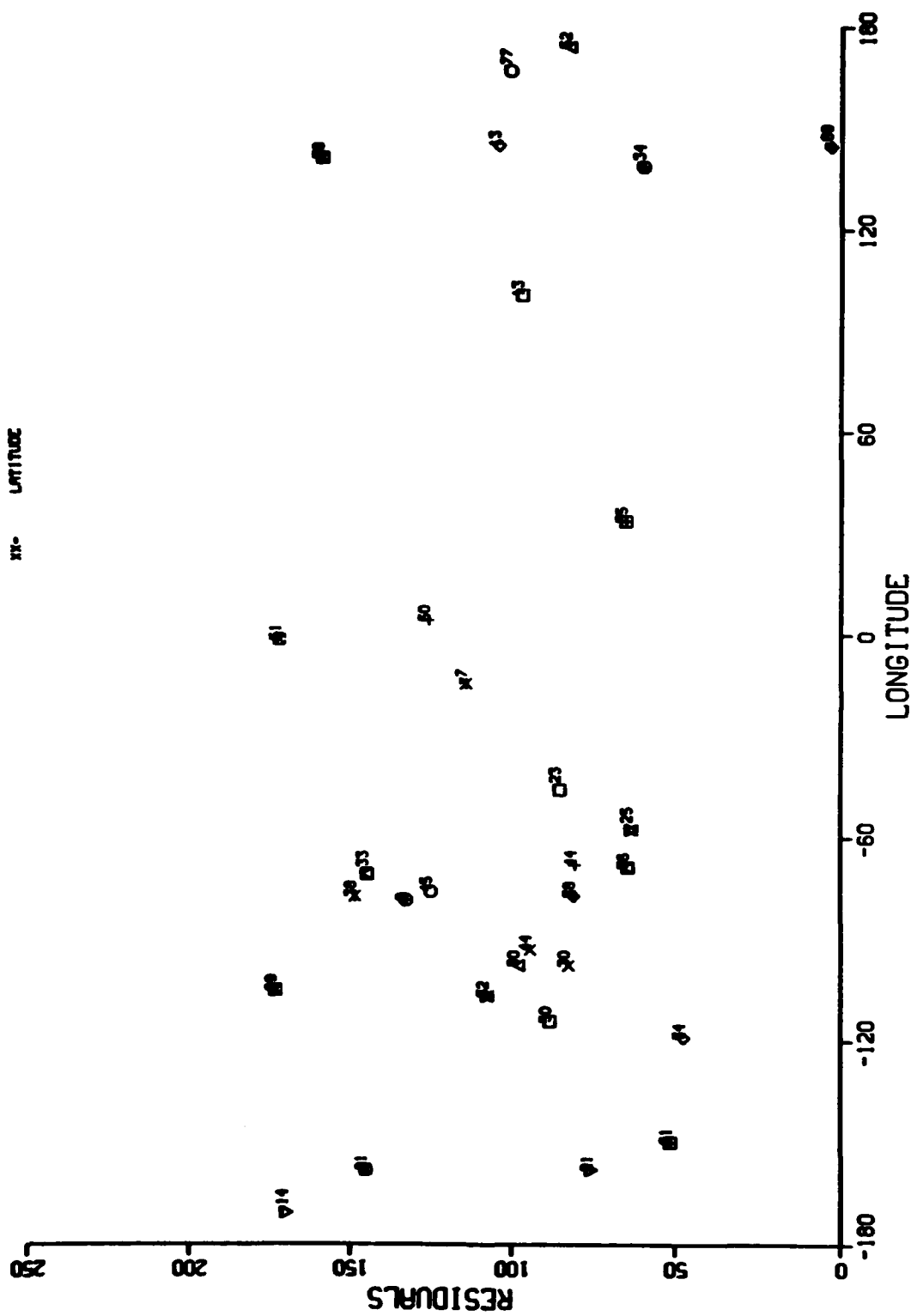


Figure 3D. Absolute Longitude Solutions(CM). Semi Short Arc//90 Deg Max Gap

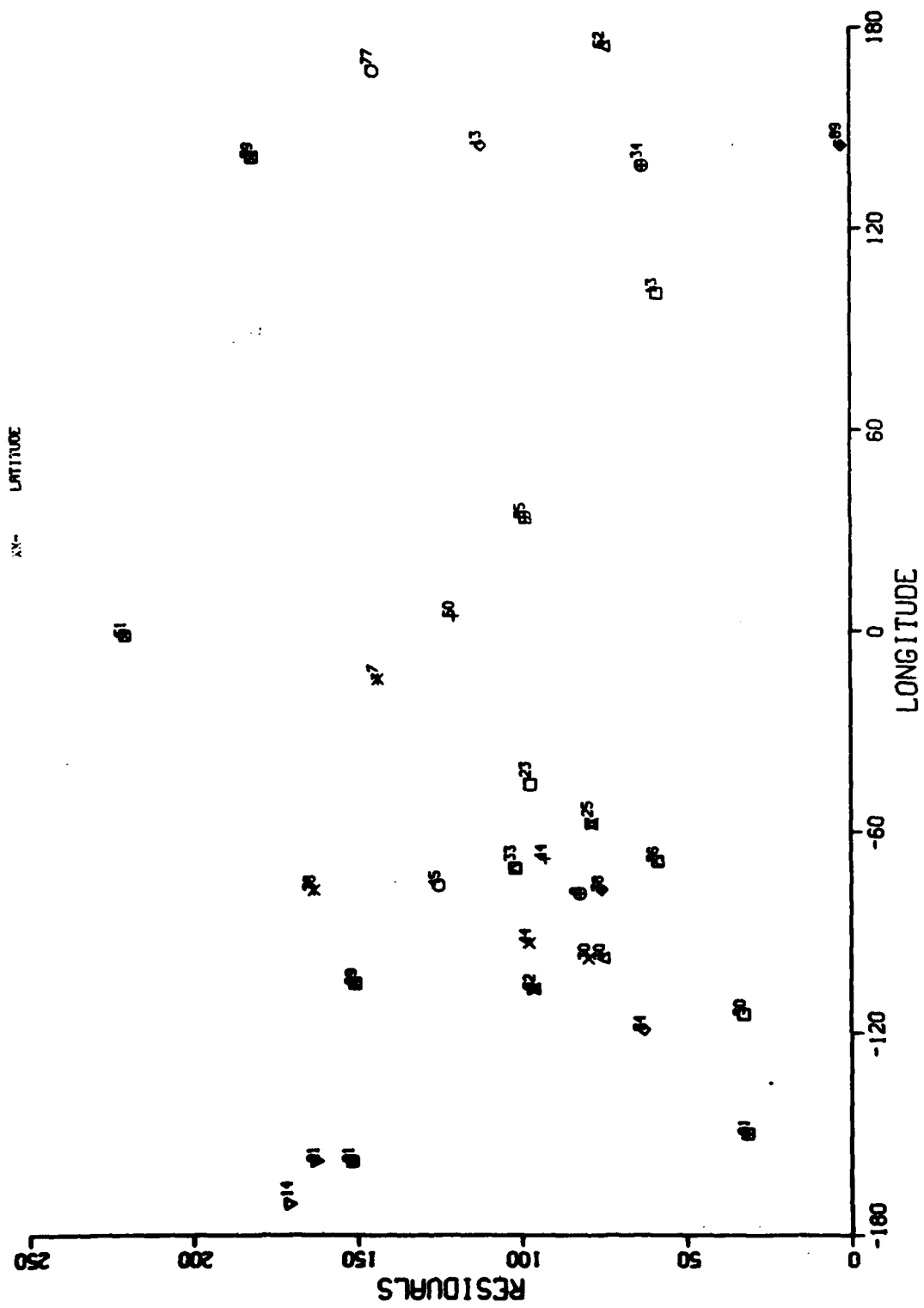


Figure 3E. Absolute Longitude Solutions(CM). Semi Short Arc//90 Deg 6 Par

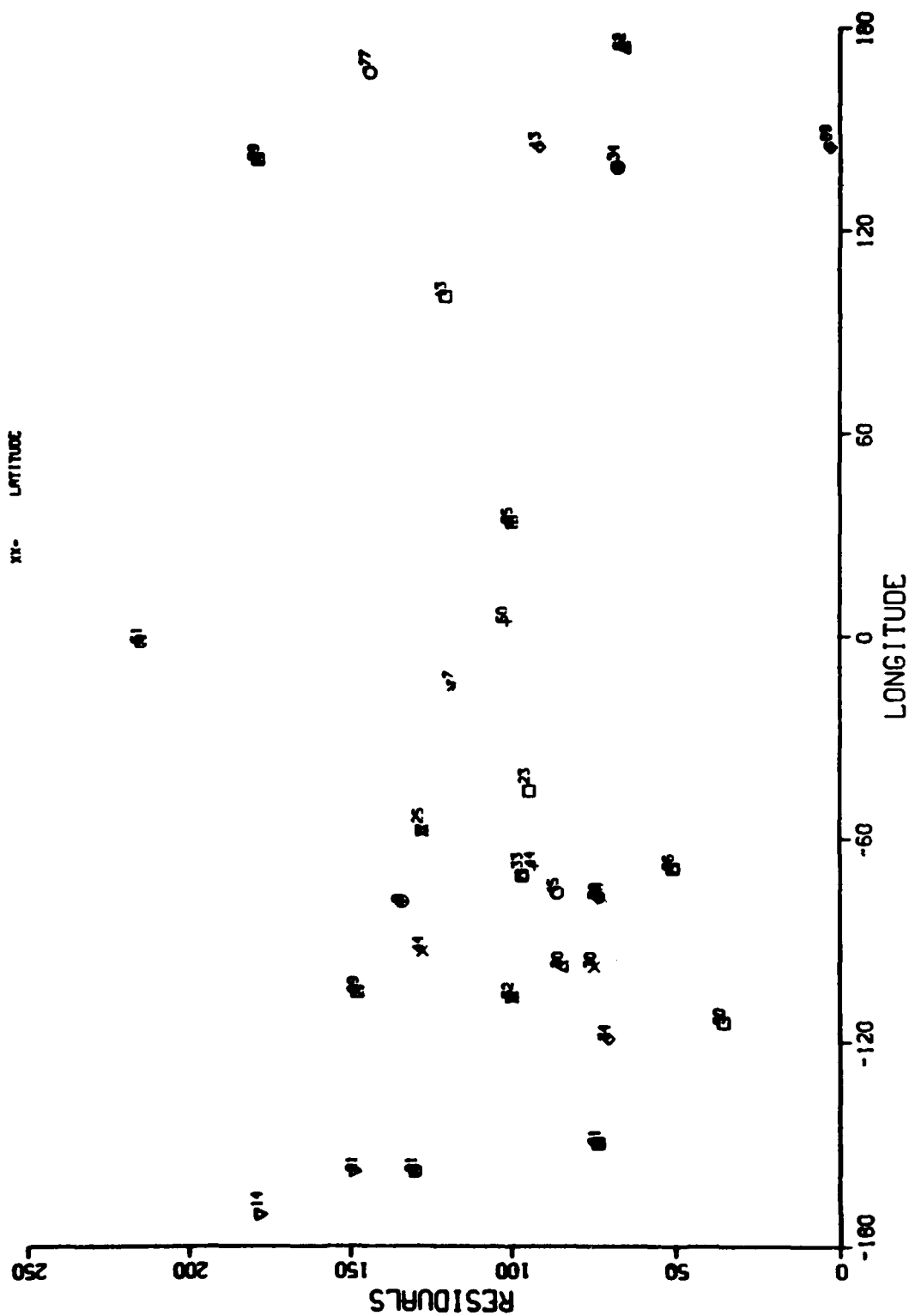


Figure 3F. Absolute Longitude Solutions(CM). Semi Short Arc/1 Rev Fit

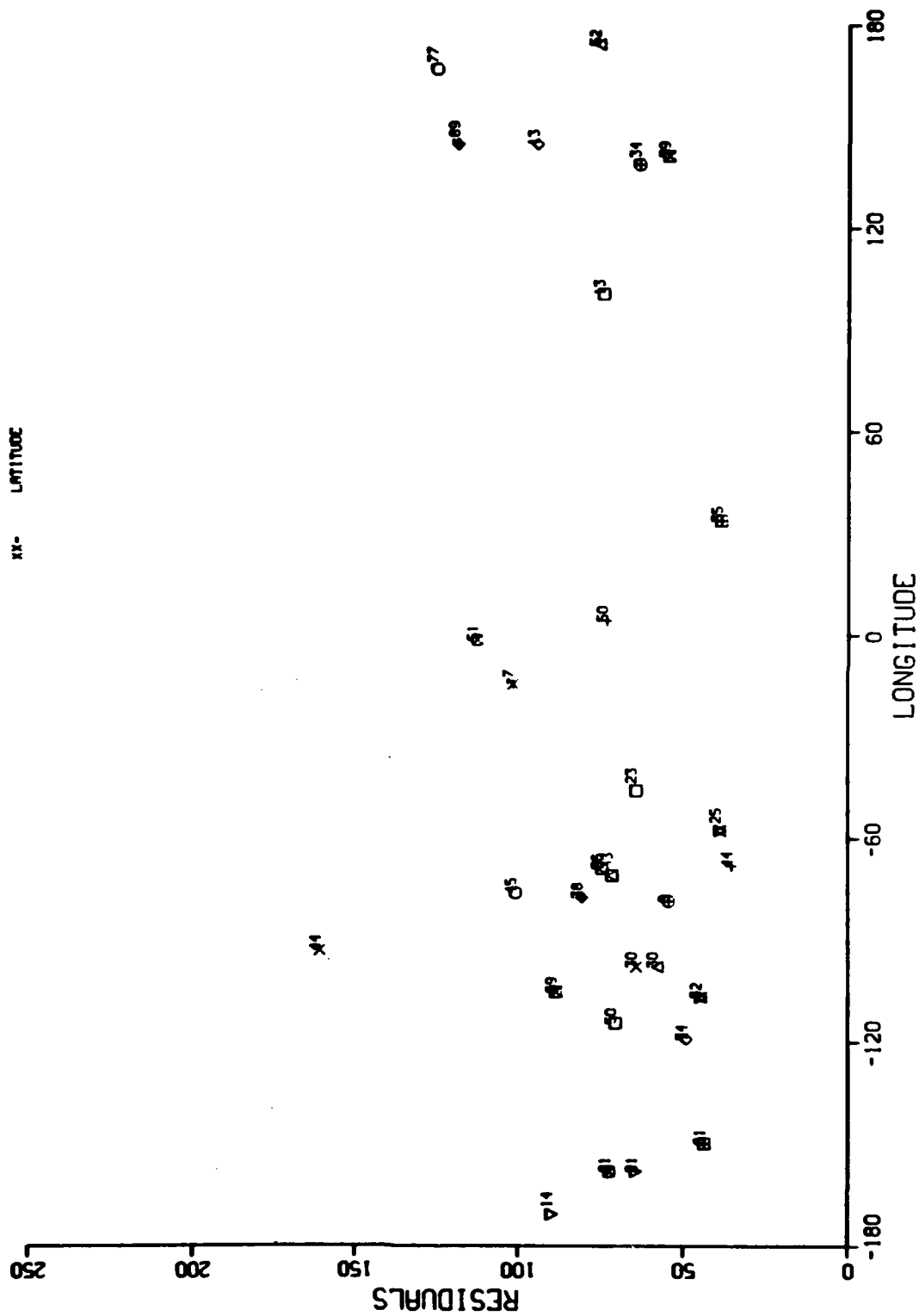


Figure 4A. Absolute Latitude Solutions(CM). Point Position/Orbit Fixed

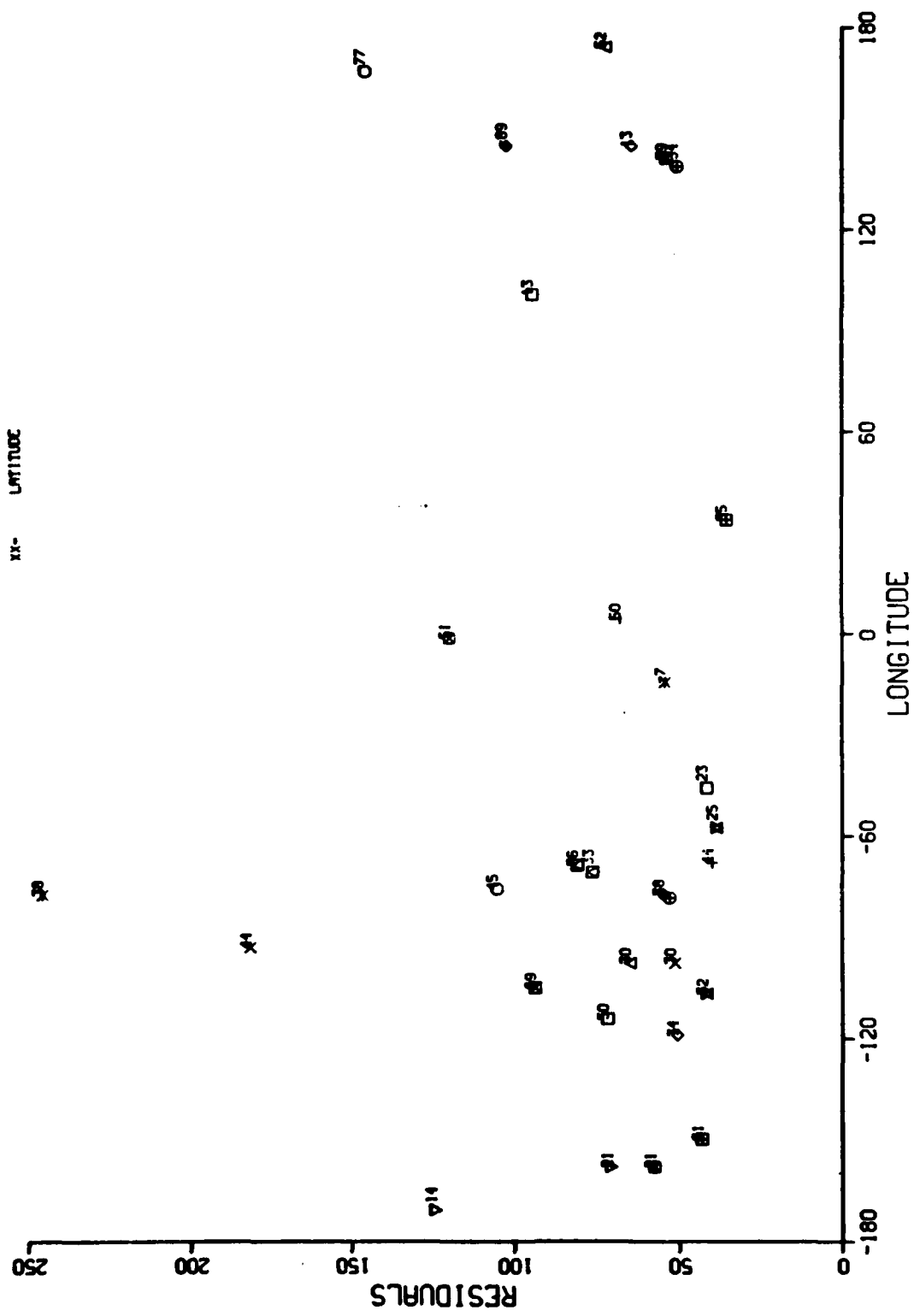


Figure 4B. Absolute Latitude Solutions (CM). Point Positions/Orbit Relaxed

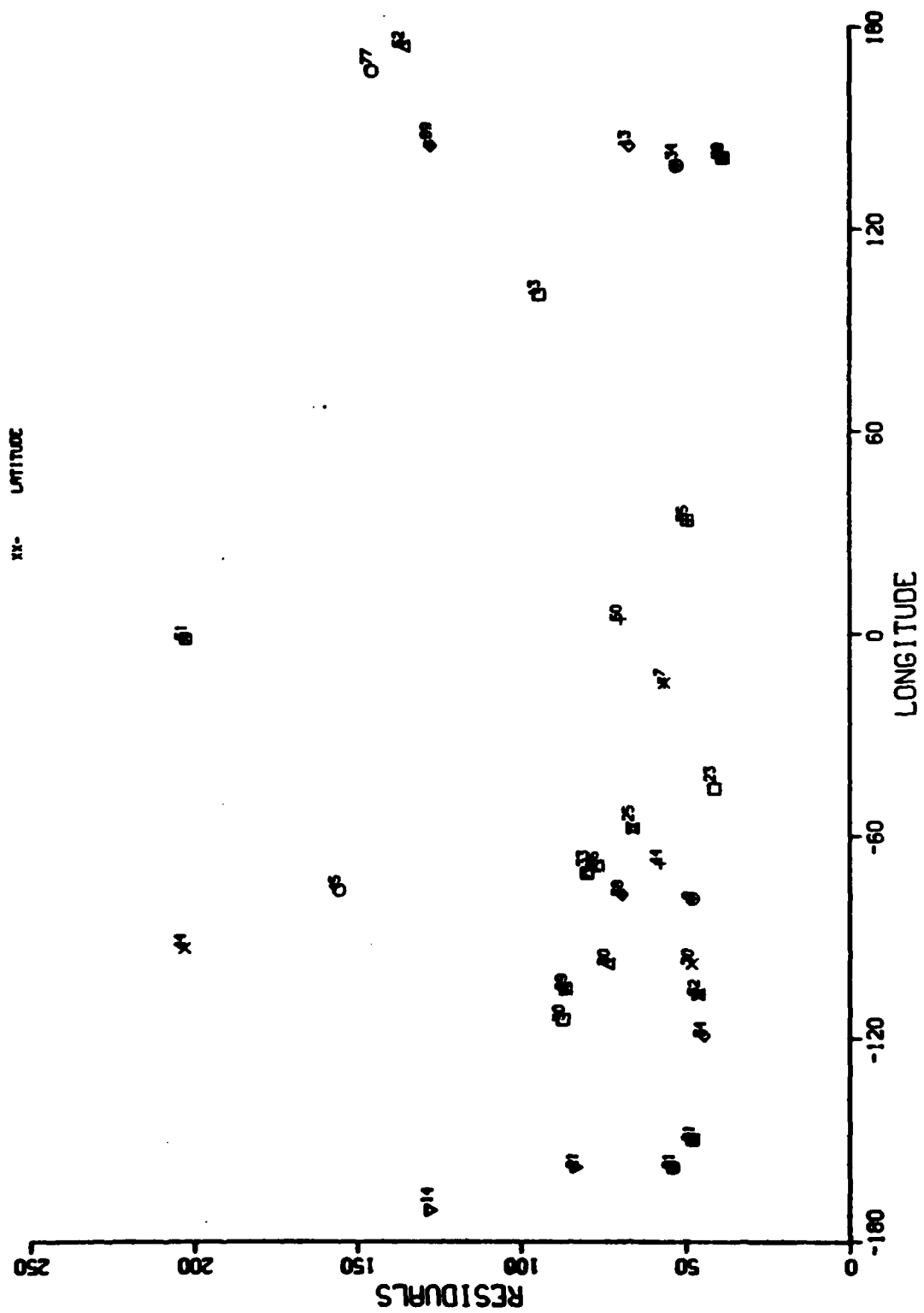


Figure 4C. Absolute Latitude Solutions(CM). Semi Short Arc//30 Deg Max Gap

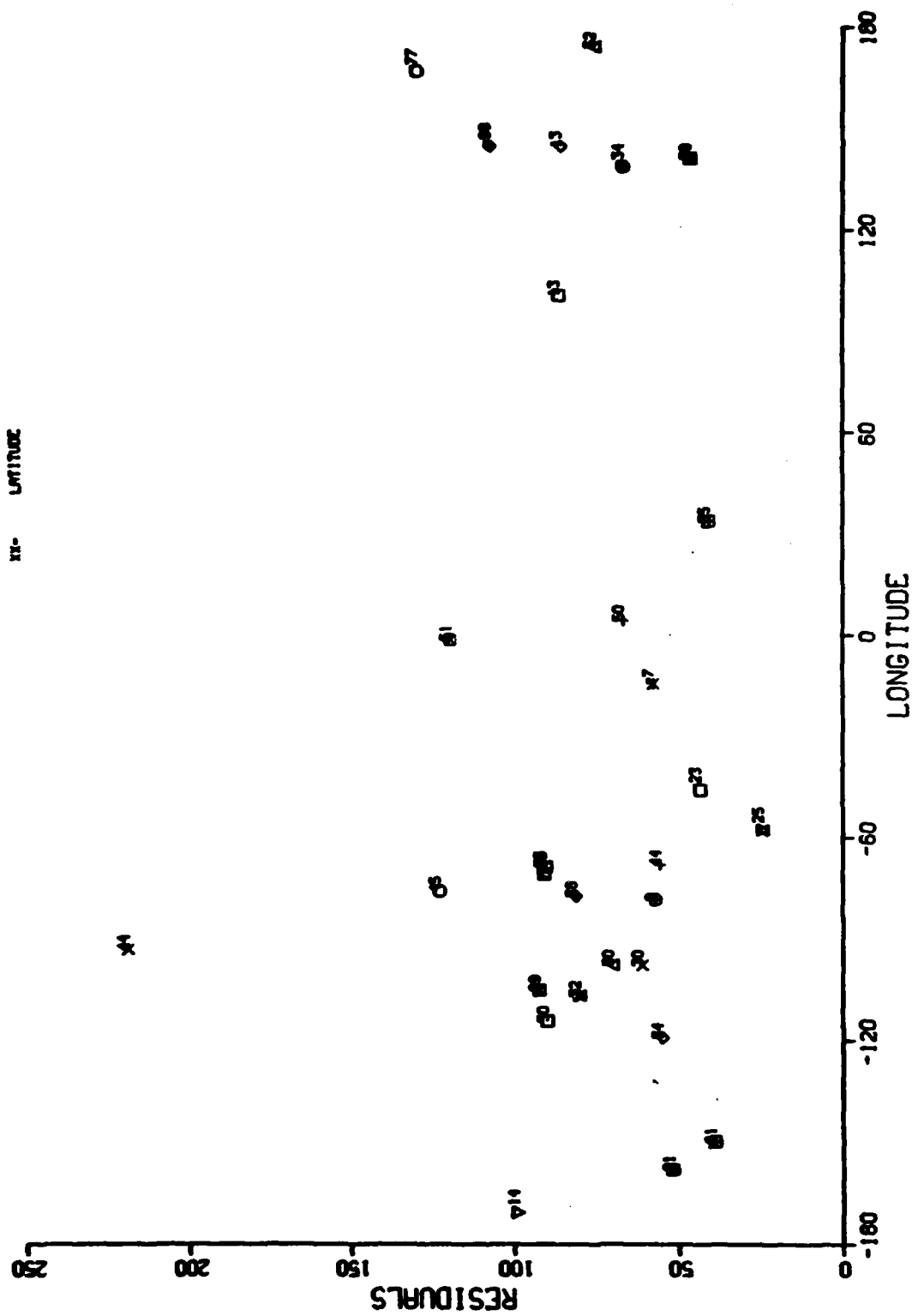


Figure 4D. Absolute Latitude Solutions(CM). Semi Short Arc//90 Deg Max Gap

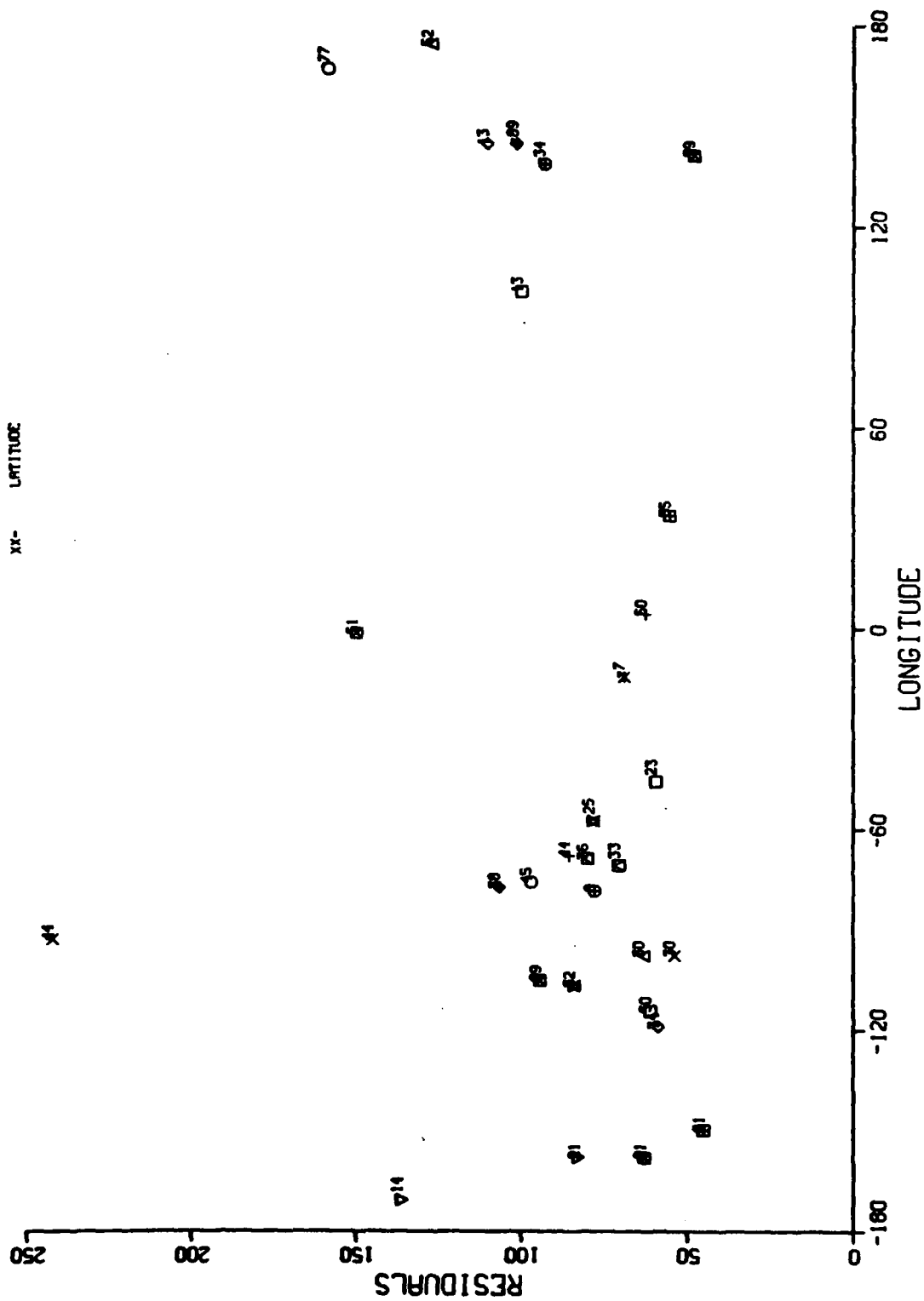


Figure 4E. Absolute Latitude Solutions(CM). Semi Short Arc//90 Deg 6 Par

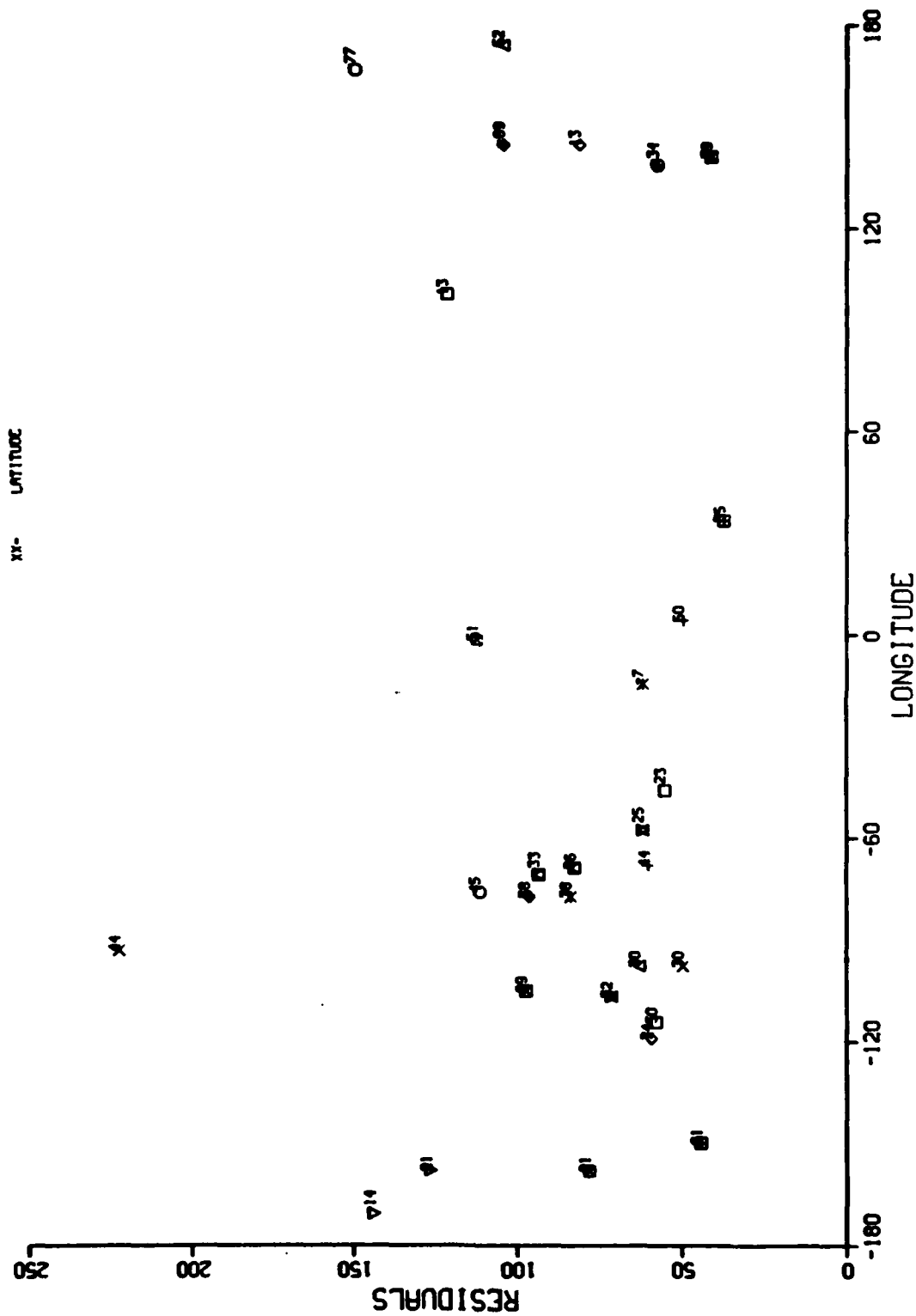


Figure 4F. Absolute Latitude Solutions(CM). Semi Short Arc/1 Rev Fit

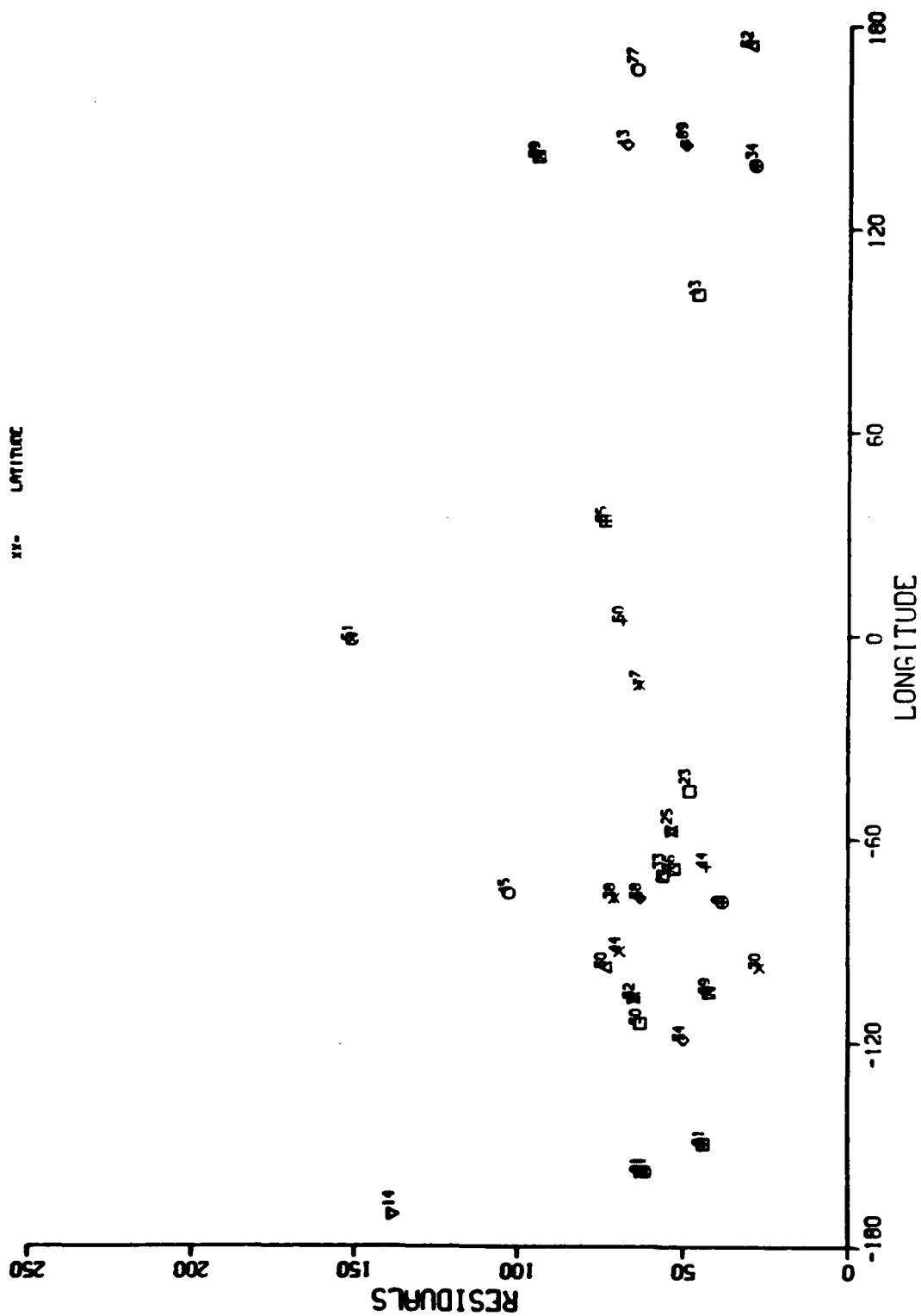


Figure 5A. Absolute Height Solutions(CM). Point Position/Orbit Fixed

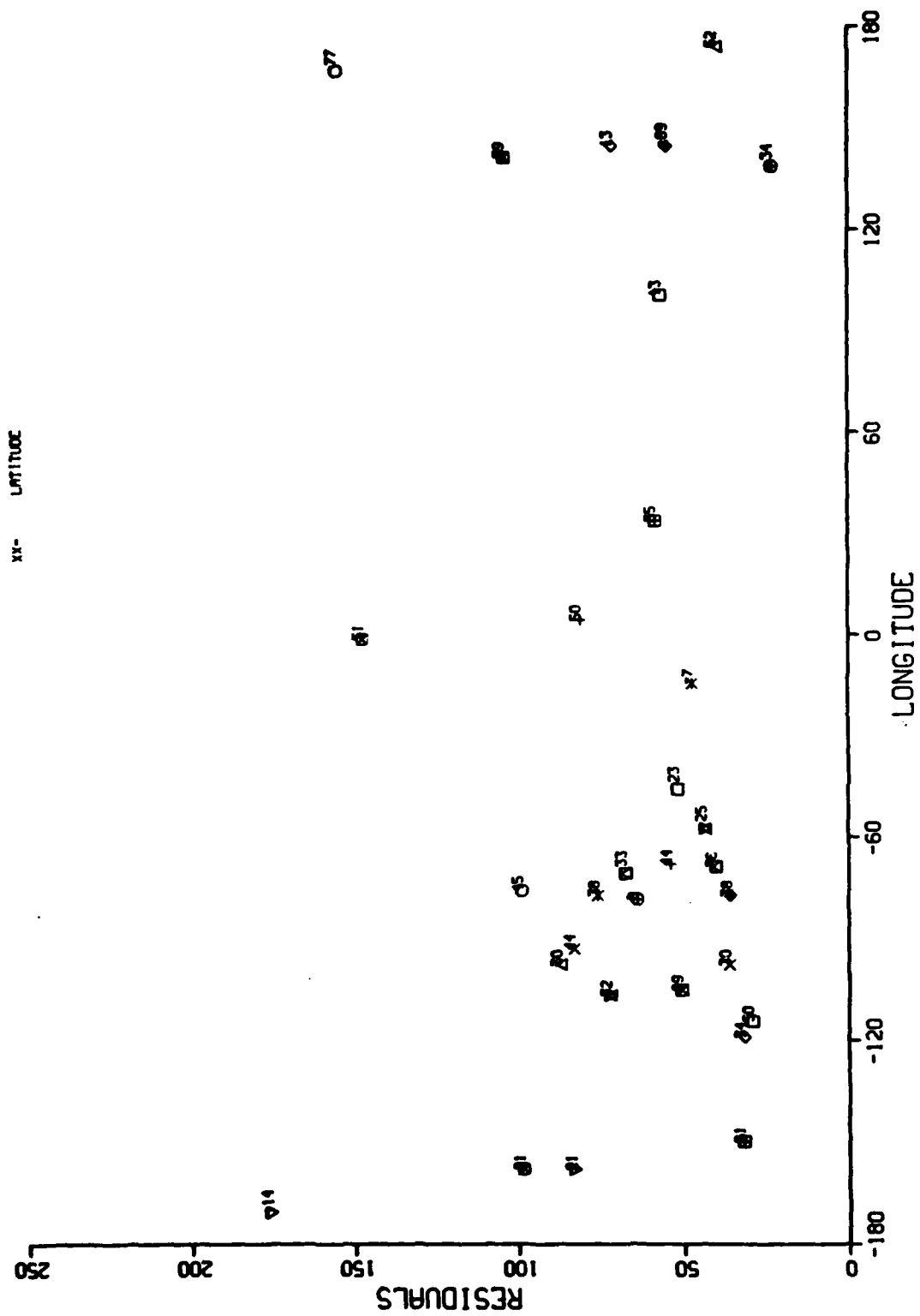


Figure 5B. Absolute Height Solutions(CM). Point Postions/Orbit Relaxed

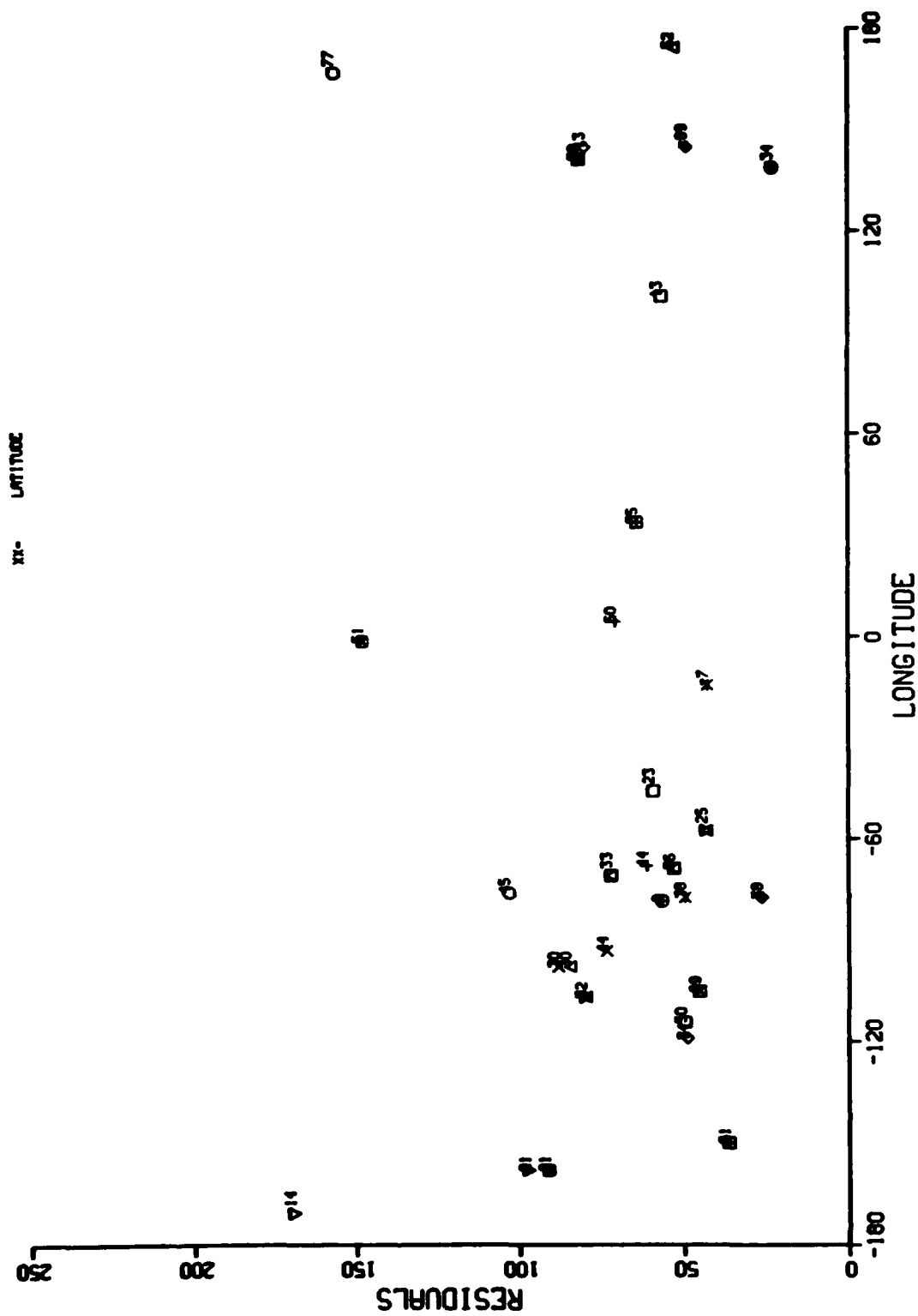


Figure 5C. Absolute Height Solutions(CM). Semi Short Arc//30 Deg Max Gap

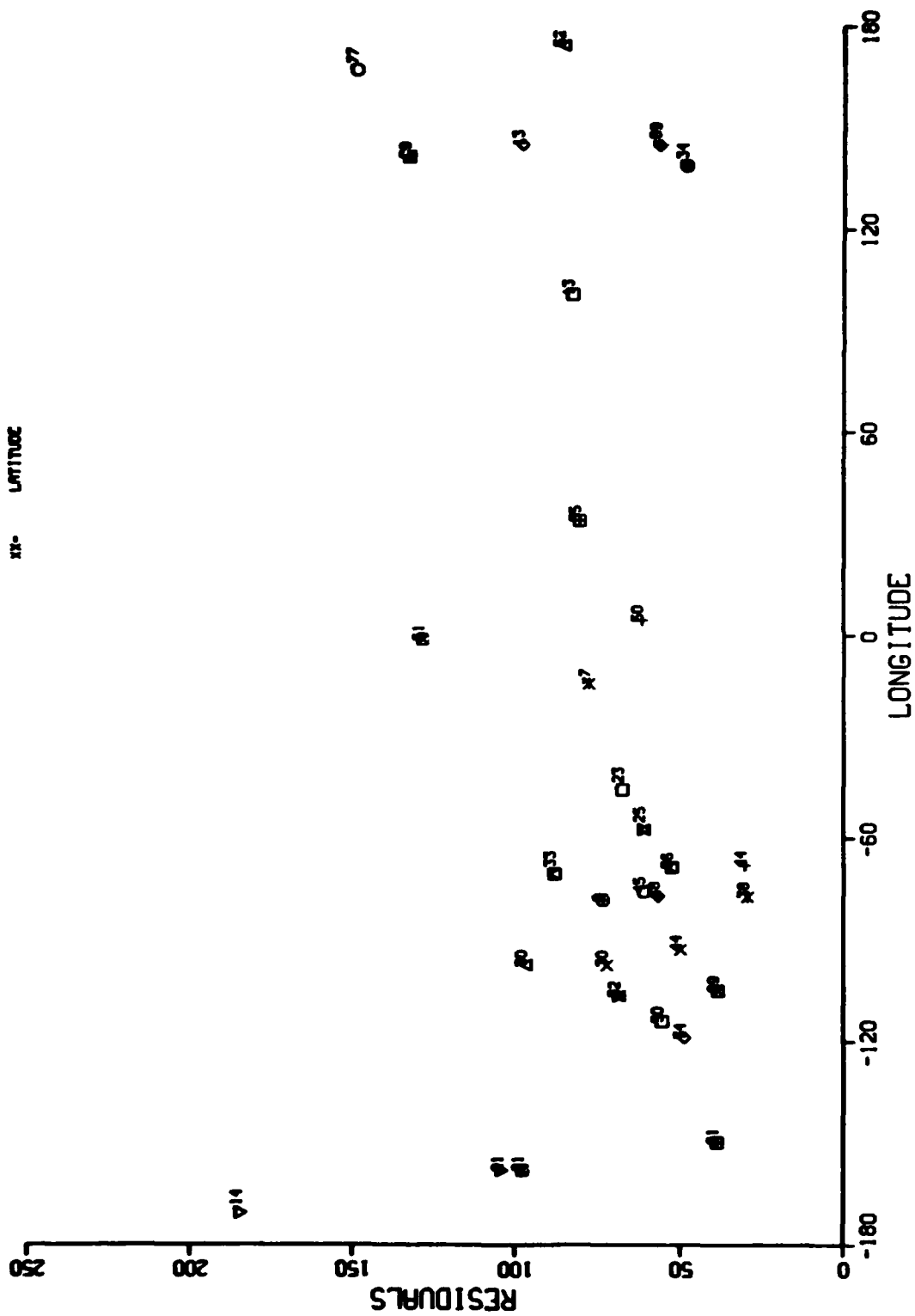


Figure 5D. Absolute Height Solutions(CM). Semi Short Arc//90 Deg Max Gap

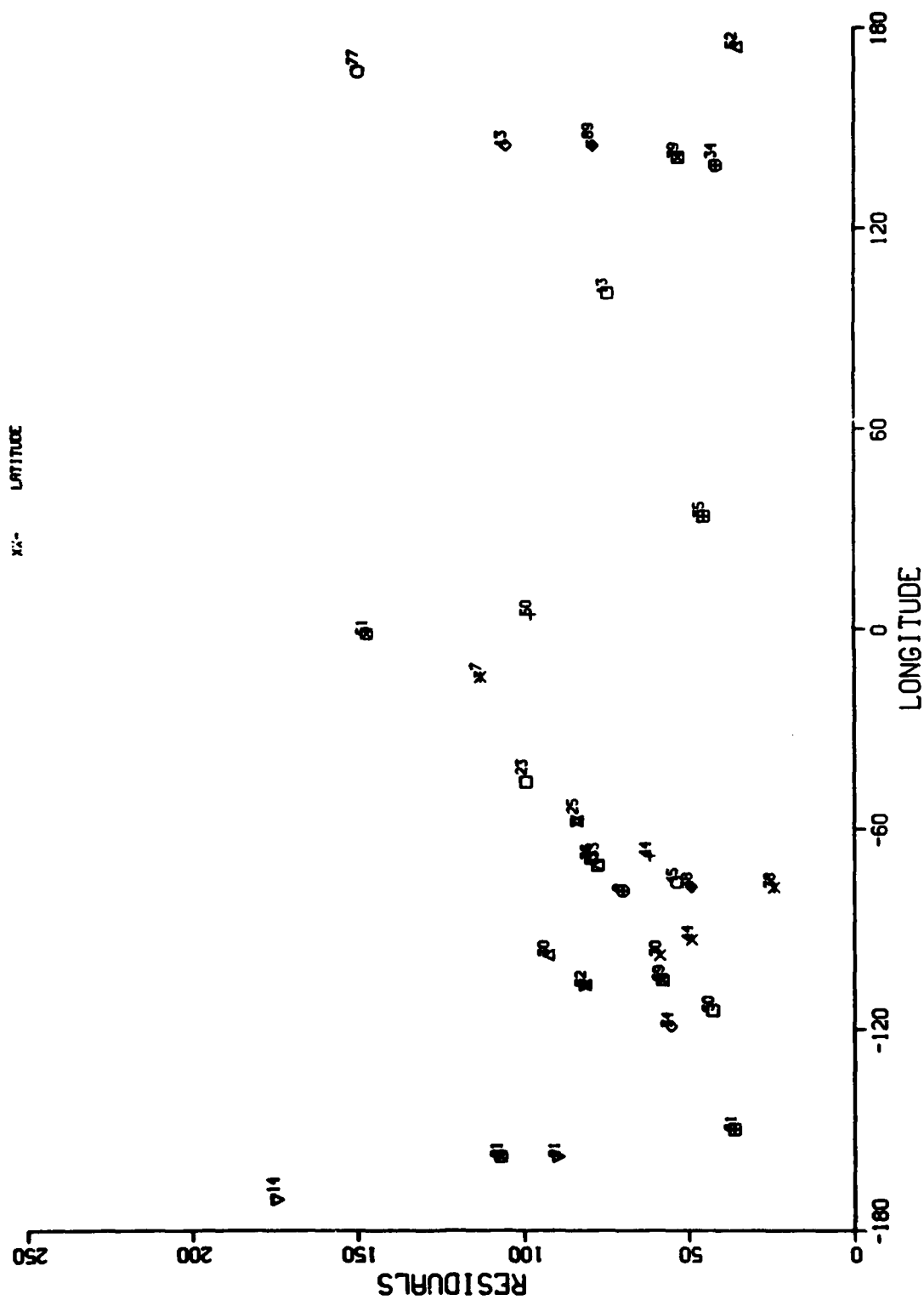


Figure 5E. Absolute Height Solutions(CM). Semi Short Arc//90 Deg 6 Par

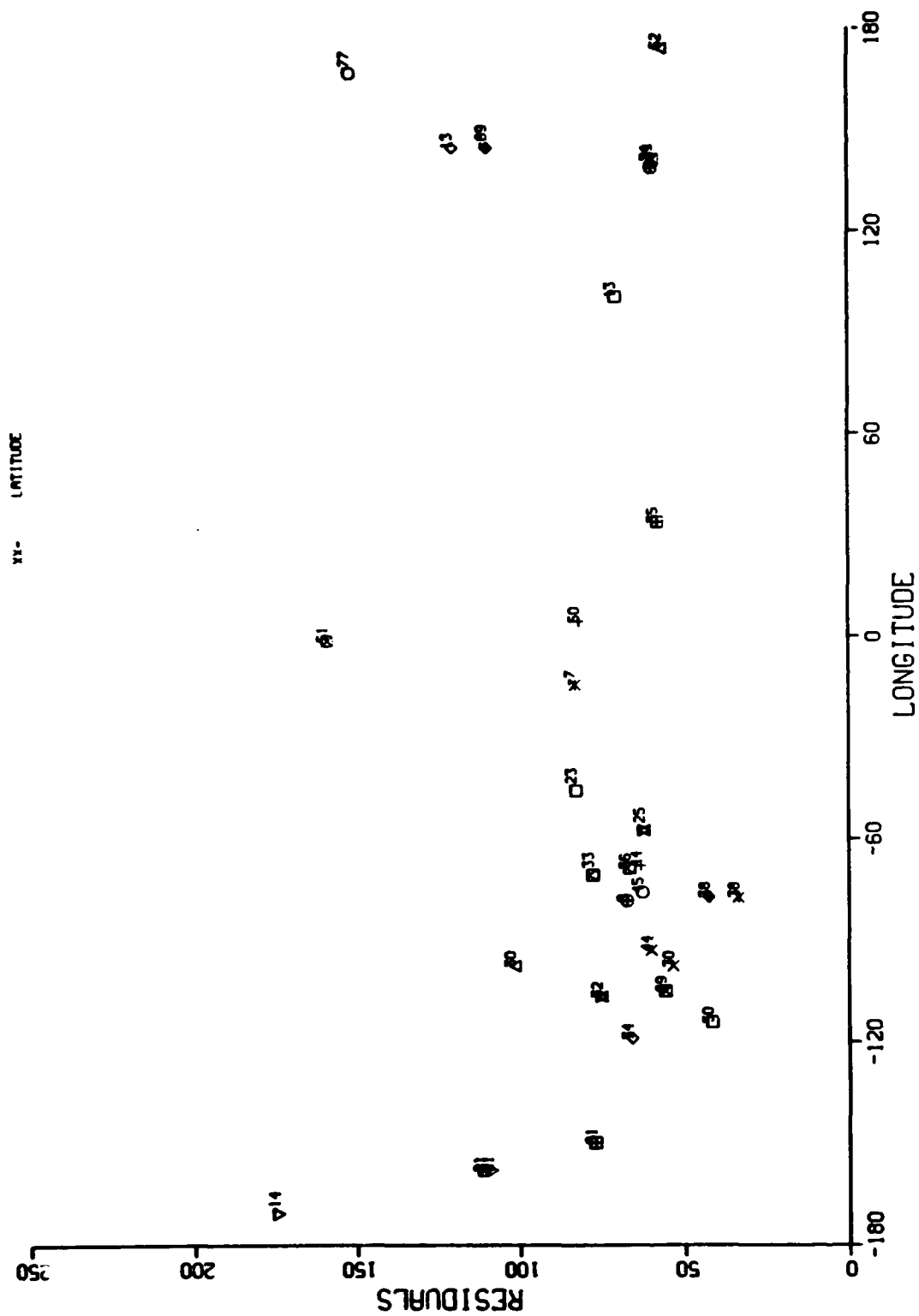


Figure 5F. Absolute Height Solutions(CM). Semi Short Arc/1 Rev Fit

APPENDIX B

GRAPHS OF STANDARD DEVIATIONS
OF RELATIVE POSITIONS

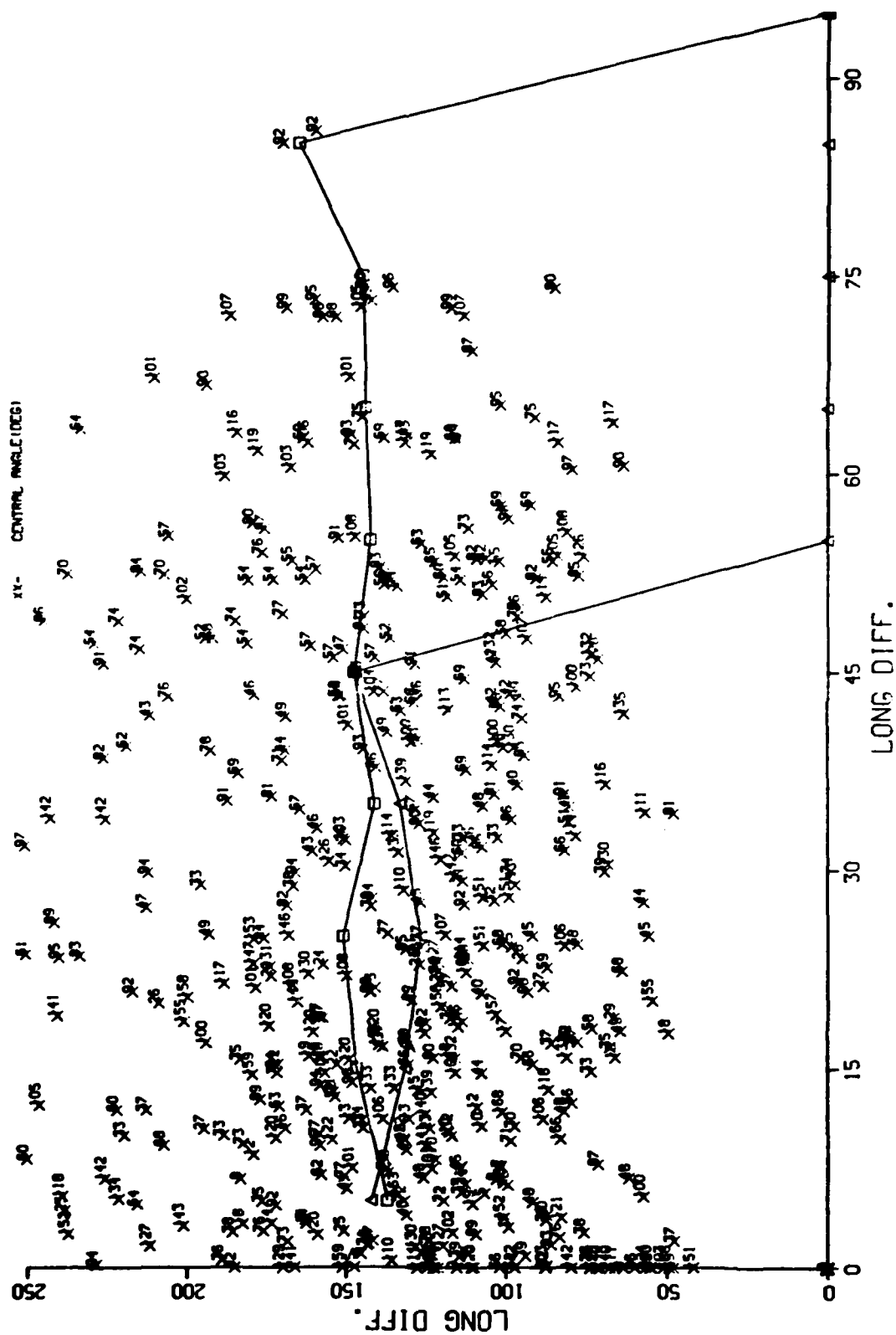


Figure 6A. Relative Longitude Residuals(CM). Point Position/Orbit Fixed

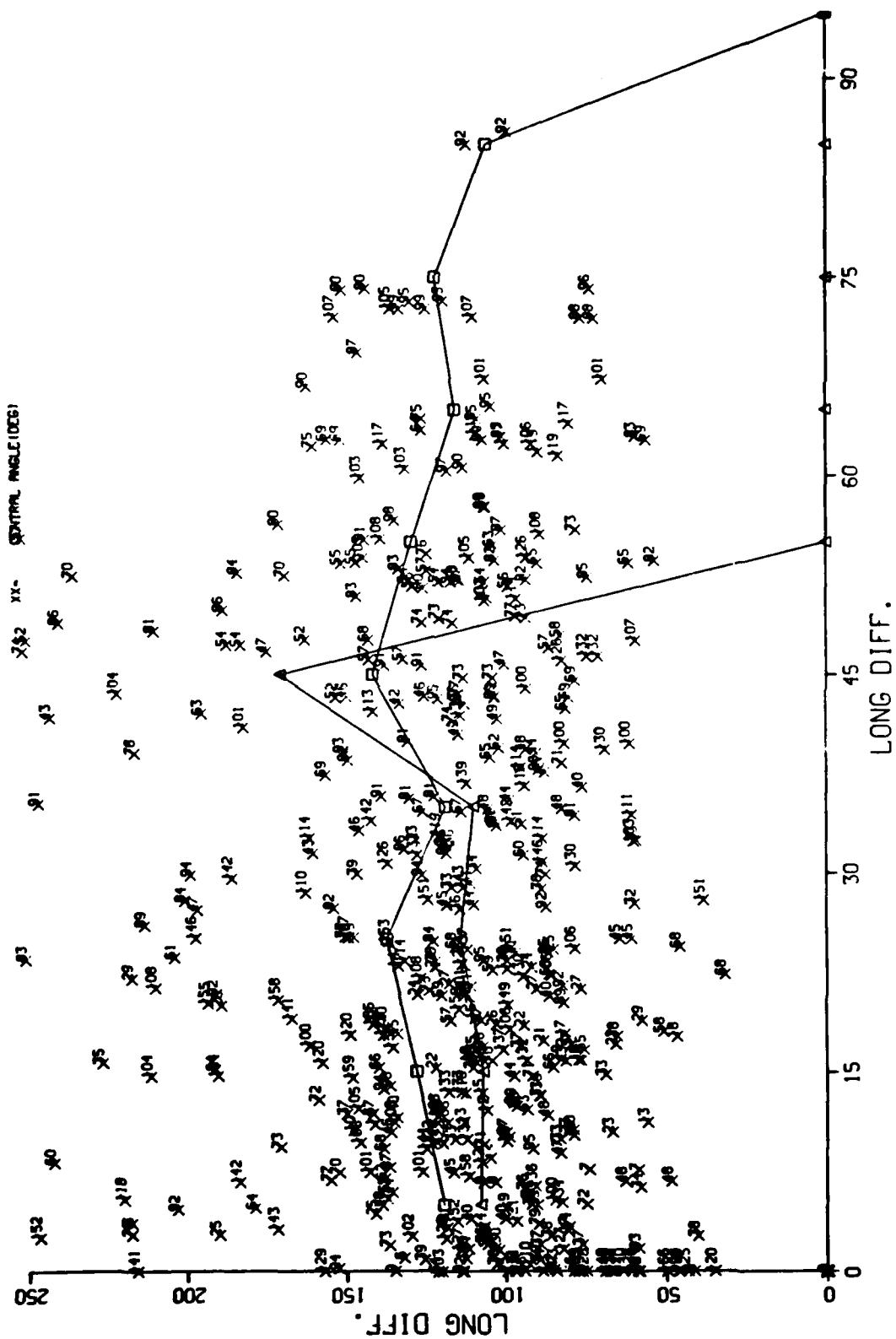


Figure 6B. Relative Longitude Residuals(CM). Point Positions/Orbit Relaxed

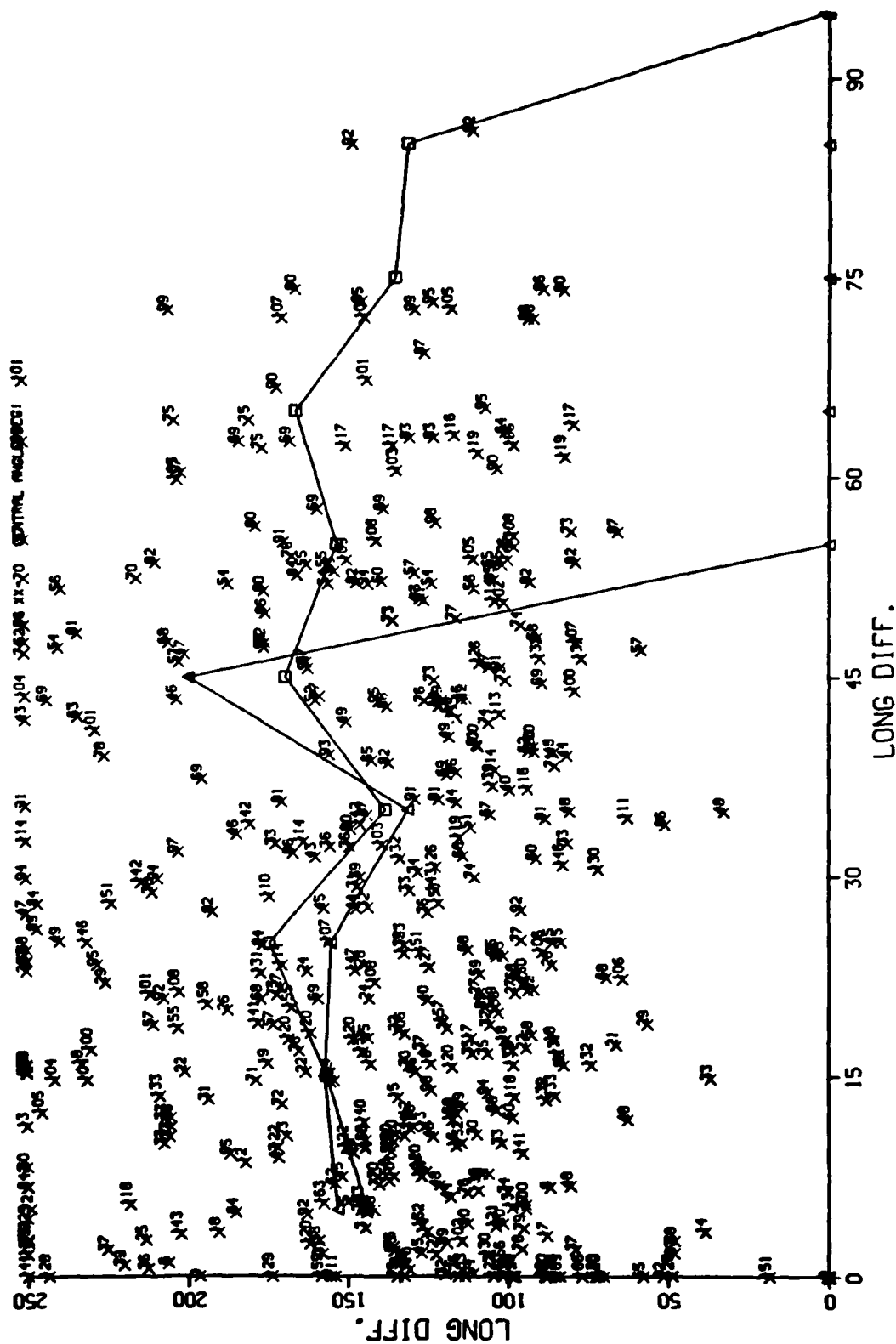


Figure 6C. Relative Longitude Residuals(CM). Semi Short Arc//30 Deg Max Gap

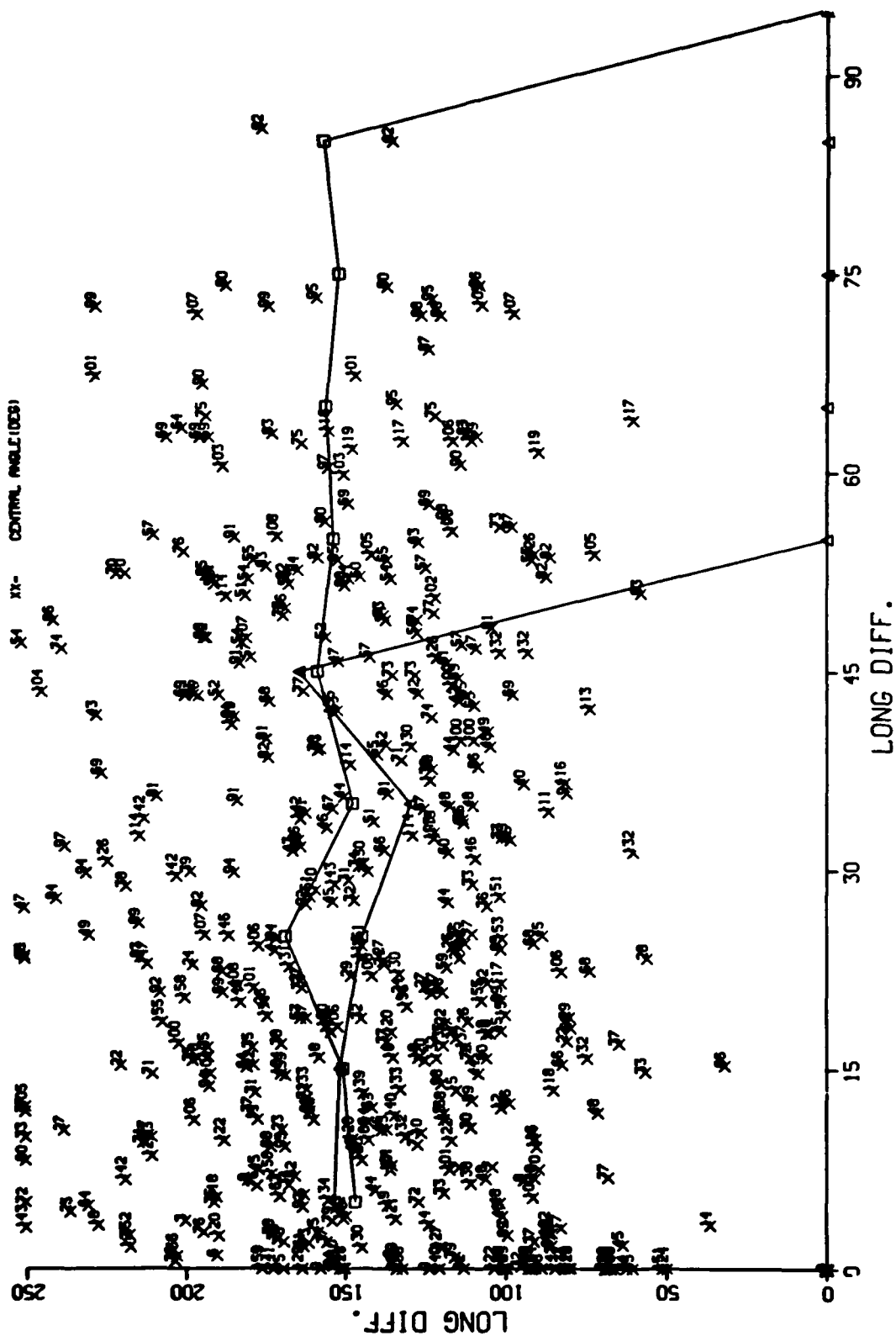
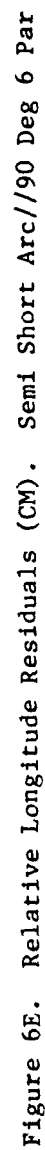


Figure 6D. Relative Longitude Residuals(CM). Semi Short Arc//90 Deg Max Gap



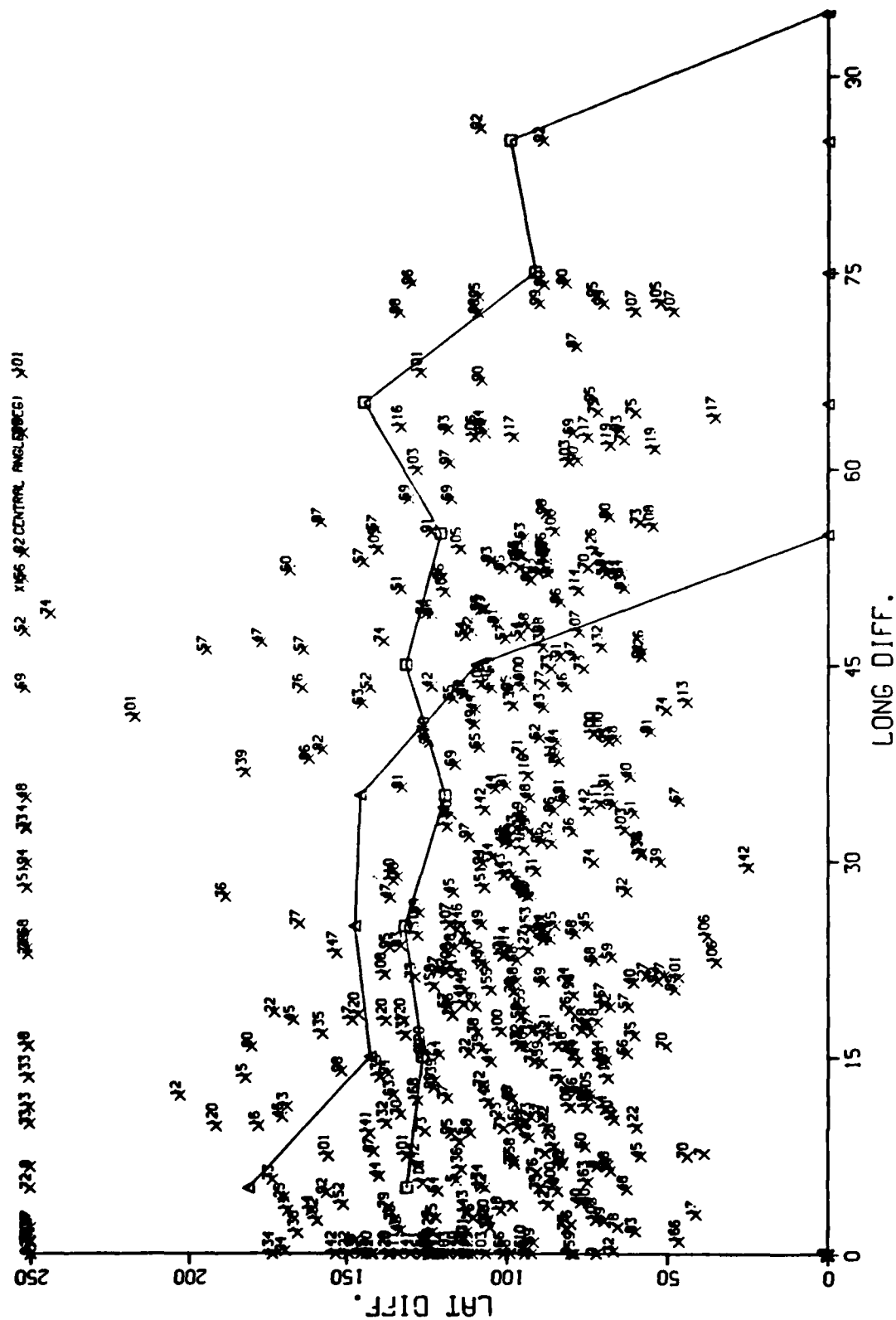


Figure 7A. Relative Latitude Residuals (CM). Point Position/Orbit Fixed

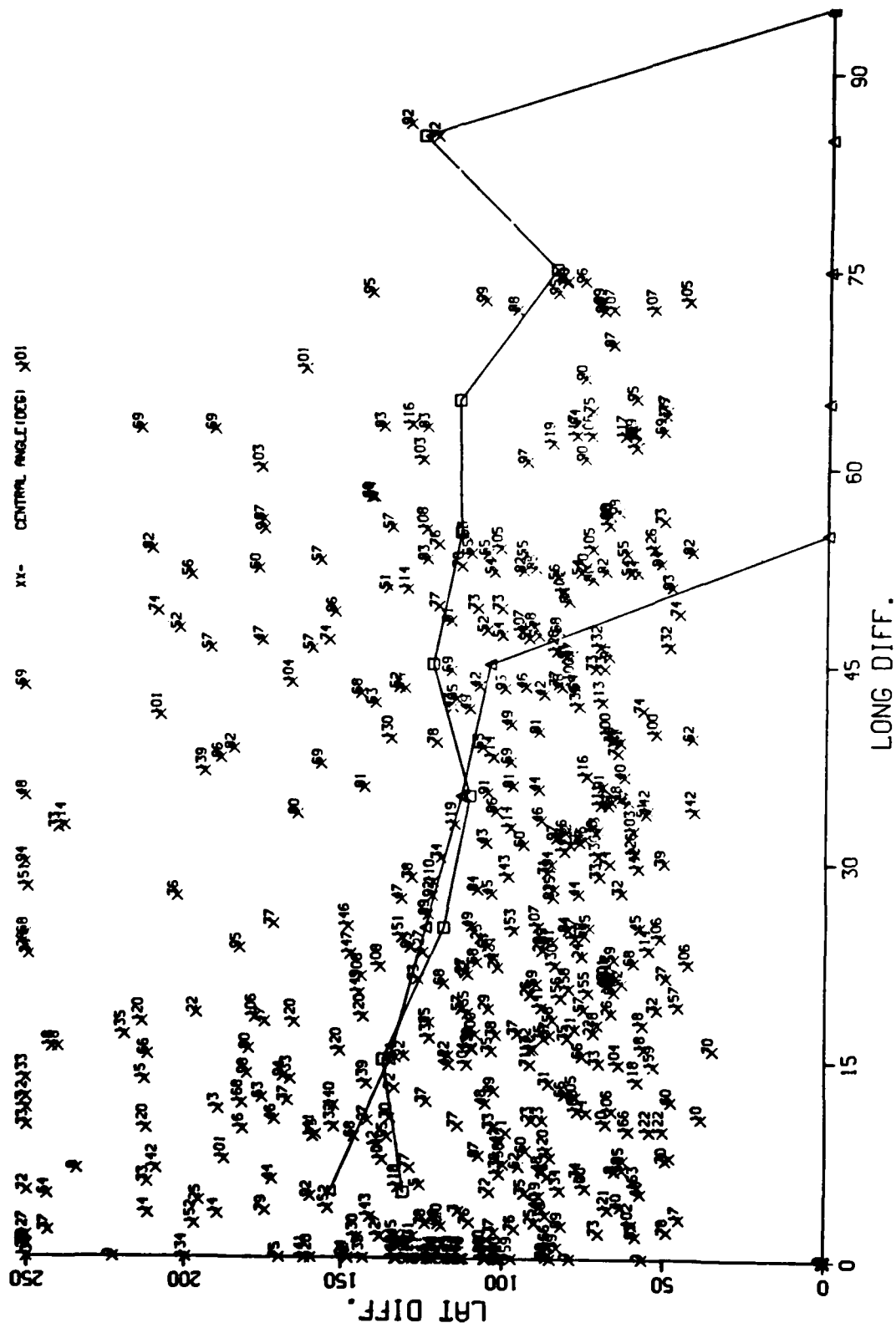


Figure 7B. Relative Latitude Residuals (CM). Point Position/Orbit Relaxed

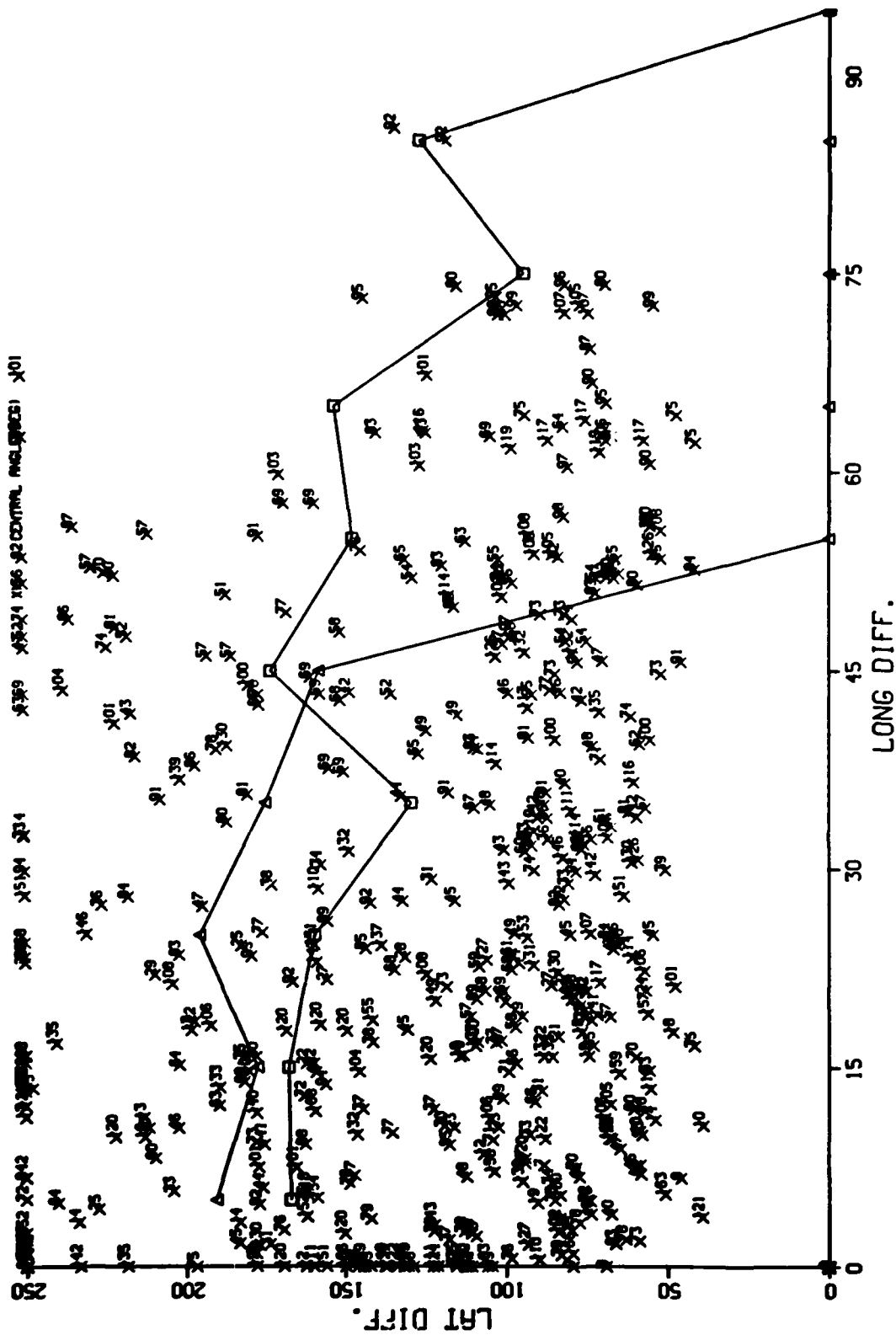


Figure 7C. Relative Latitude Residuals (CM). Semi Short Arc//30 Deg Max Gap

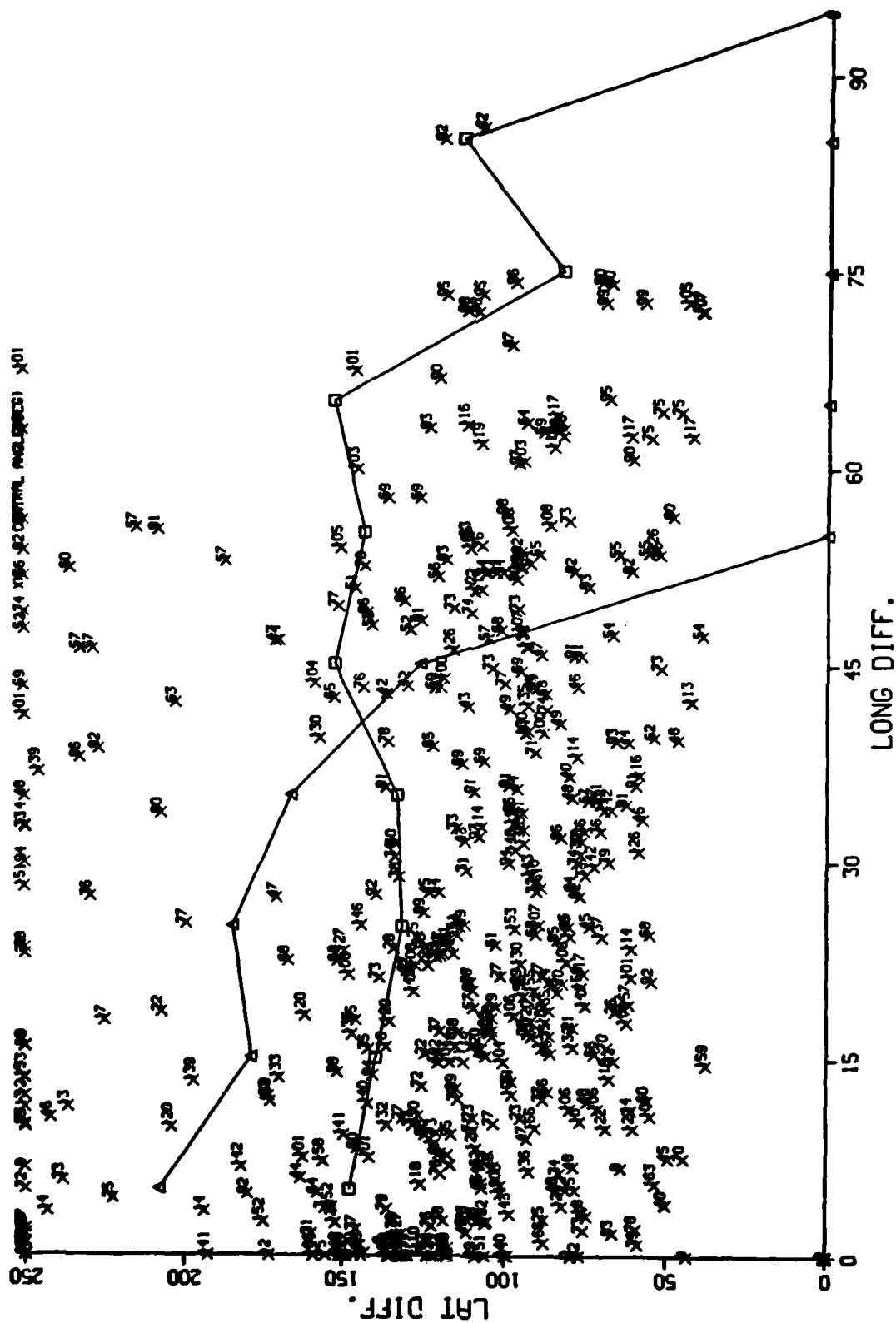
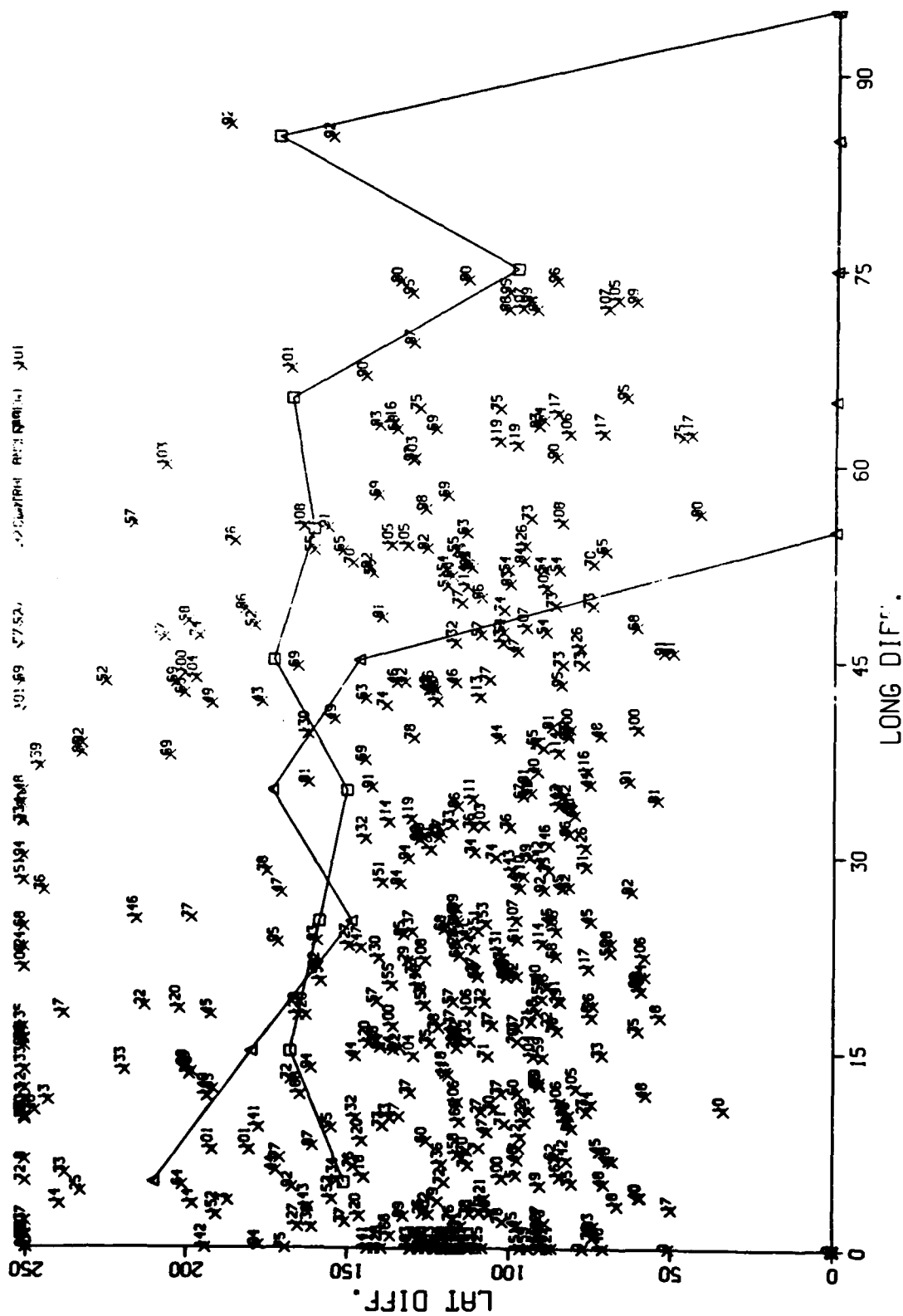


Figure 7D. Relative Latitude Residuals (CM). Semi Short Arc//90 Deg Max Gap



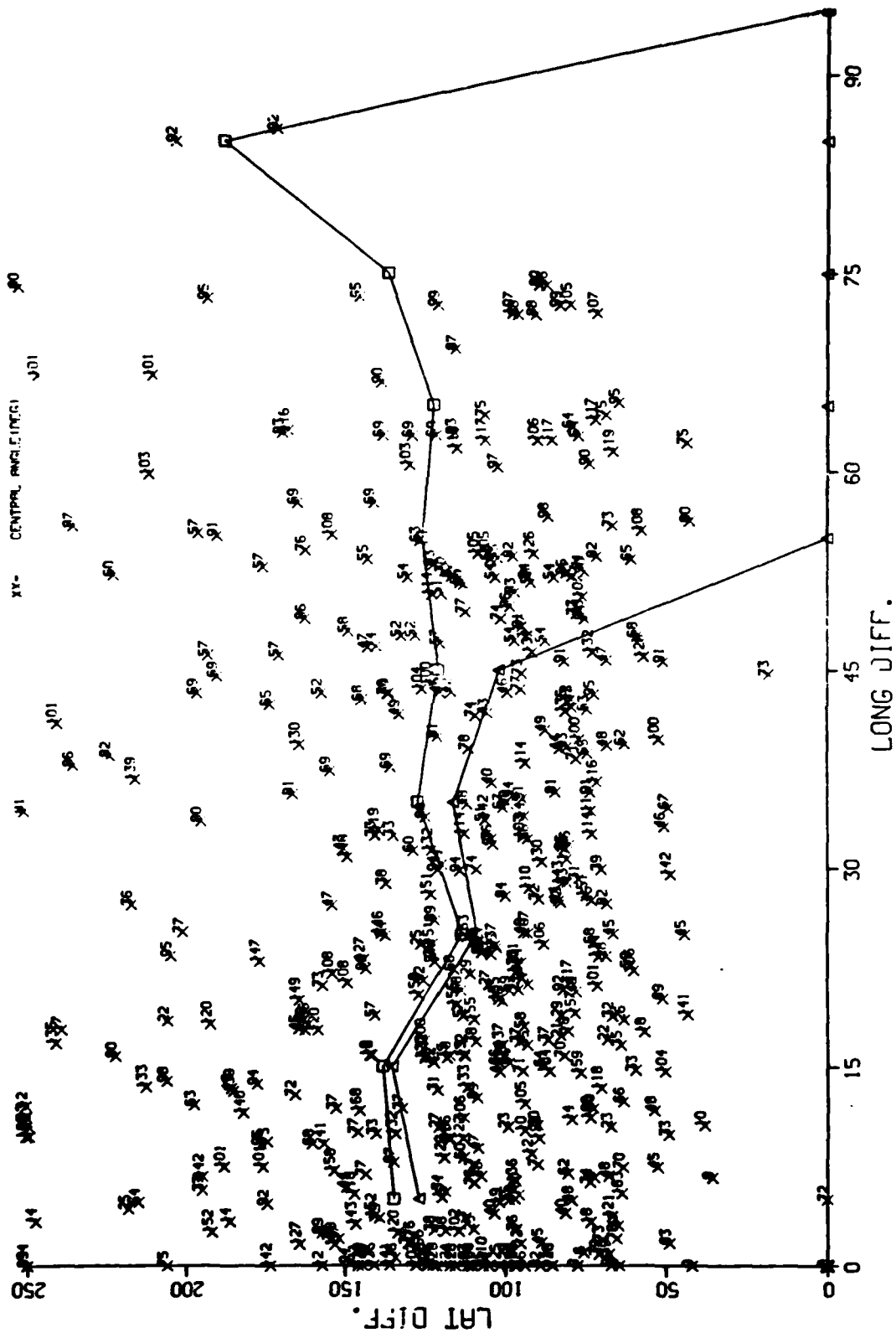


Figure 7F. Relative Latitude Residuals (CM). Semi Short Arc/1 Rev Fit

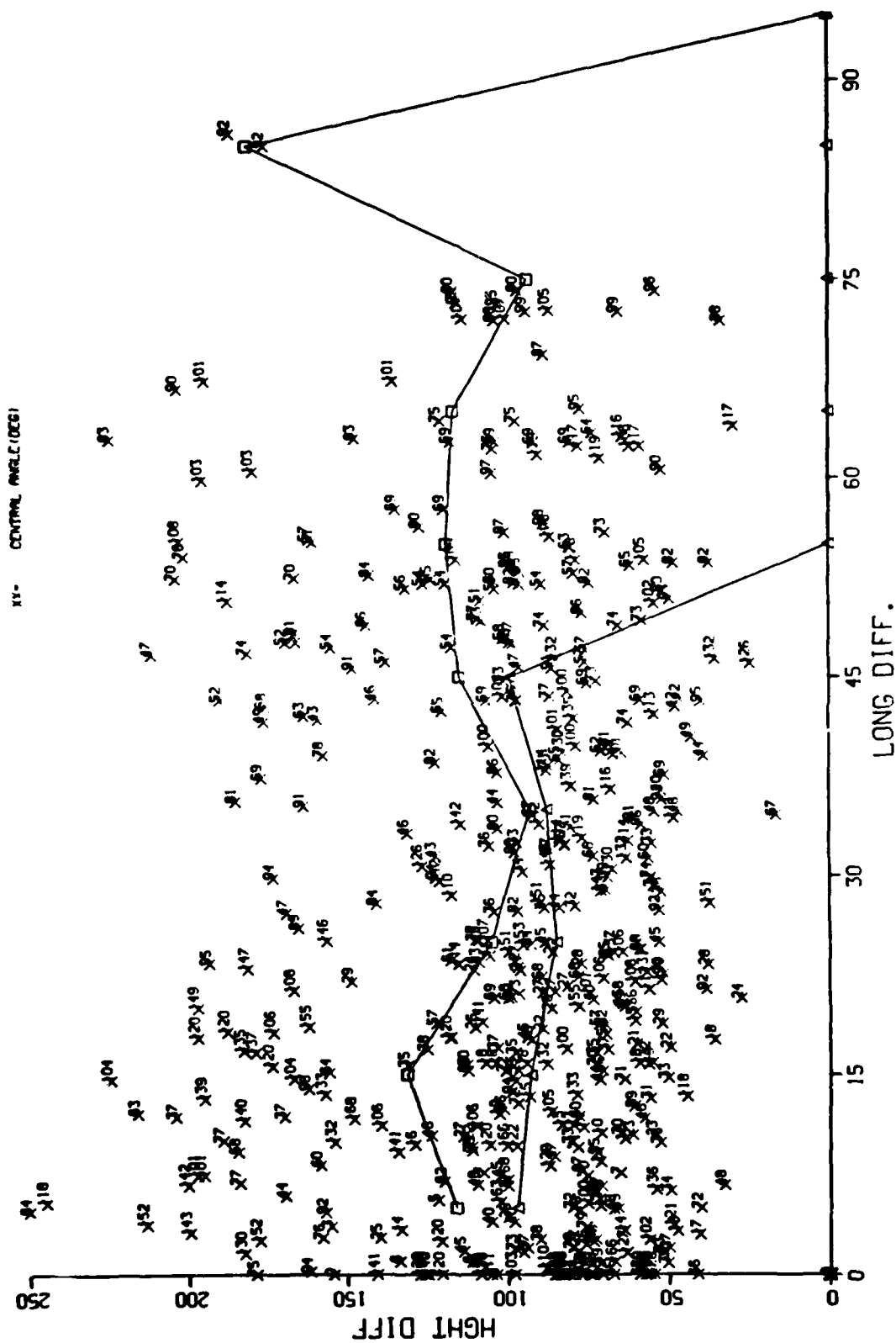


Figure 8B. Relative Height Residuals (CM). Point Positions/Orbit Relaxed

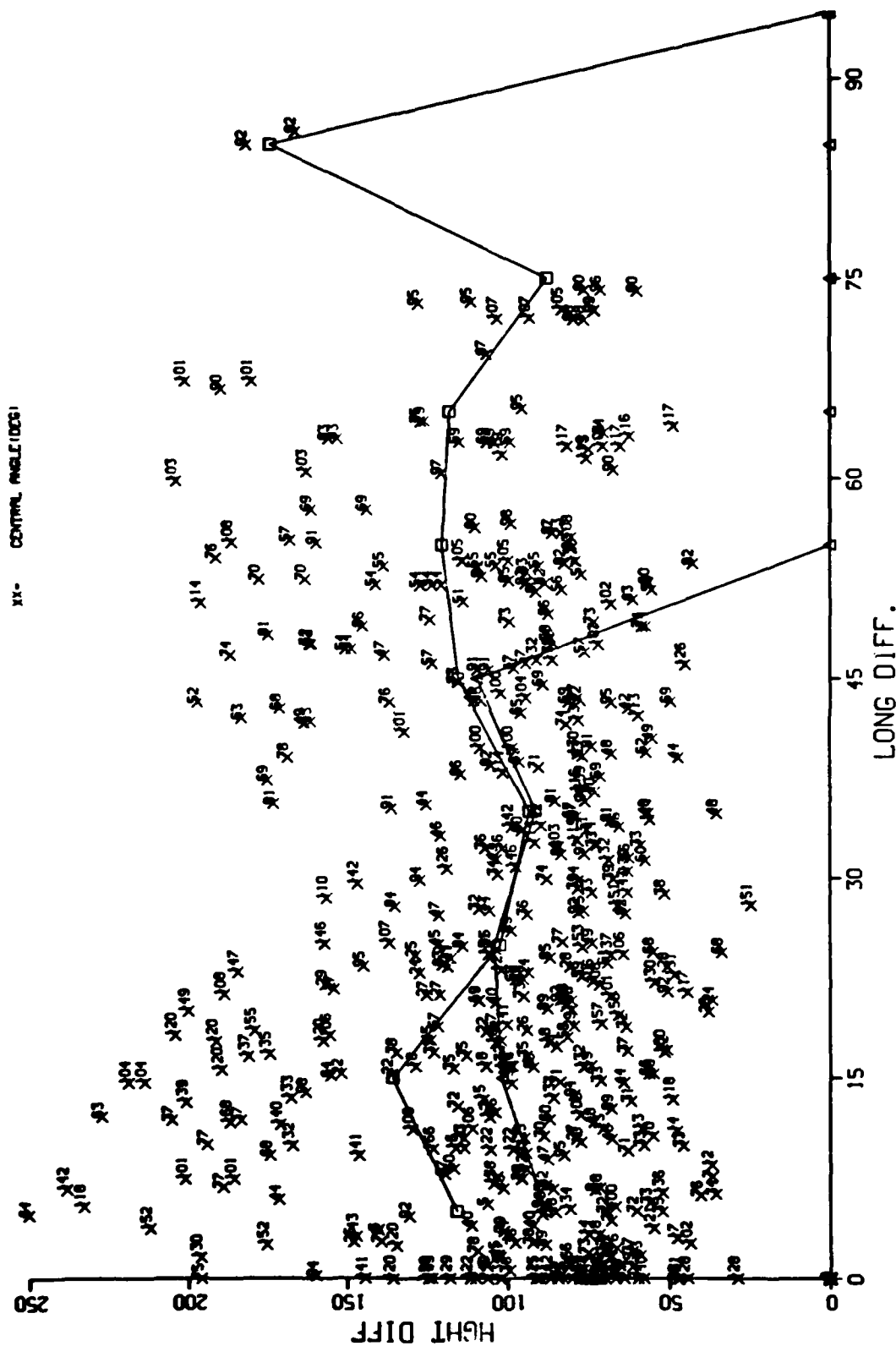


Figure 8C. Relative Height Residuals (CM). Semi Short Arc//30 Deg Max Gap

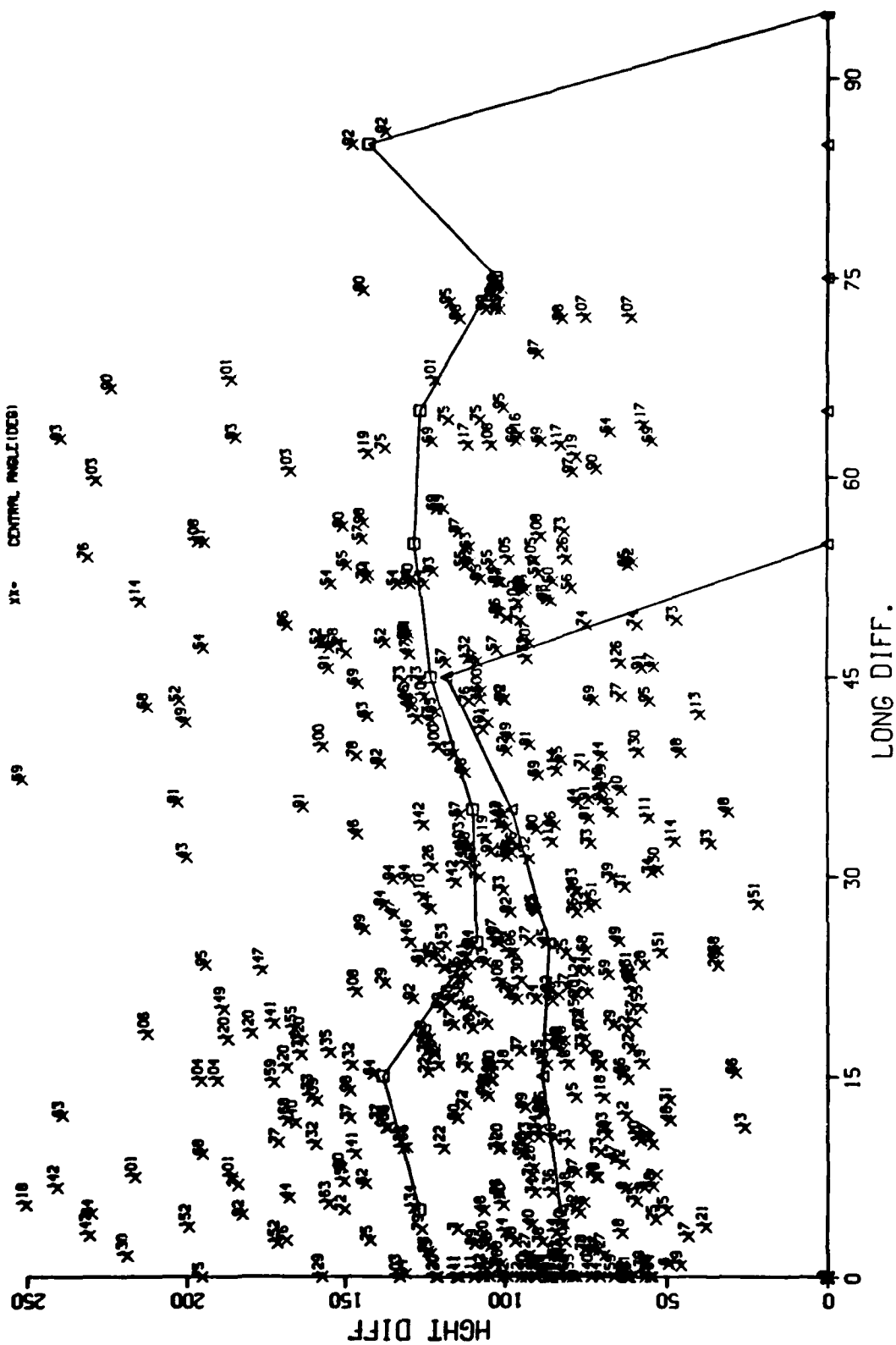


Figure 8D. Relative Height Residuals (CM). Semi Short Arc//90 Deg Max Gap

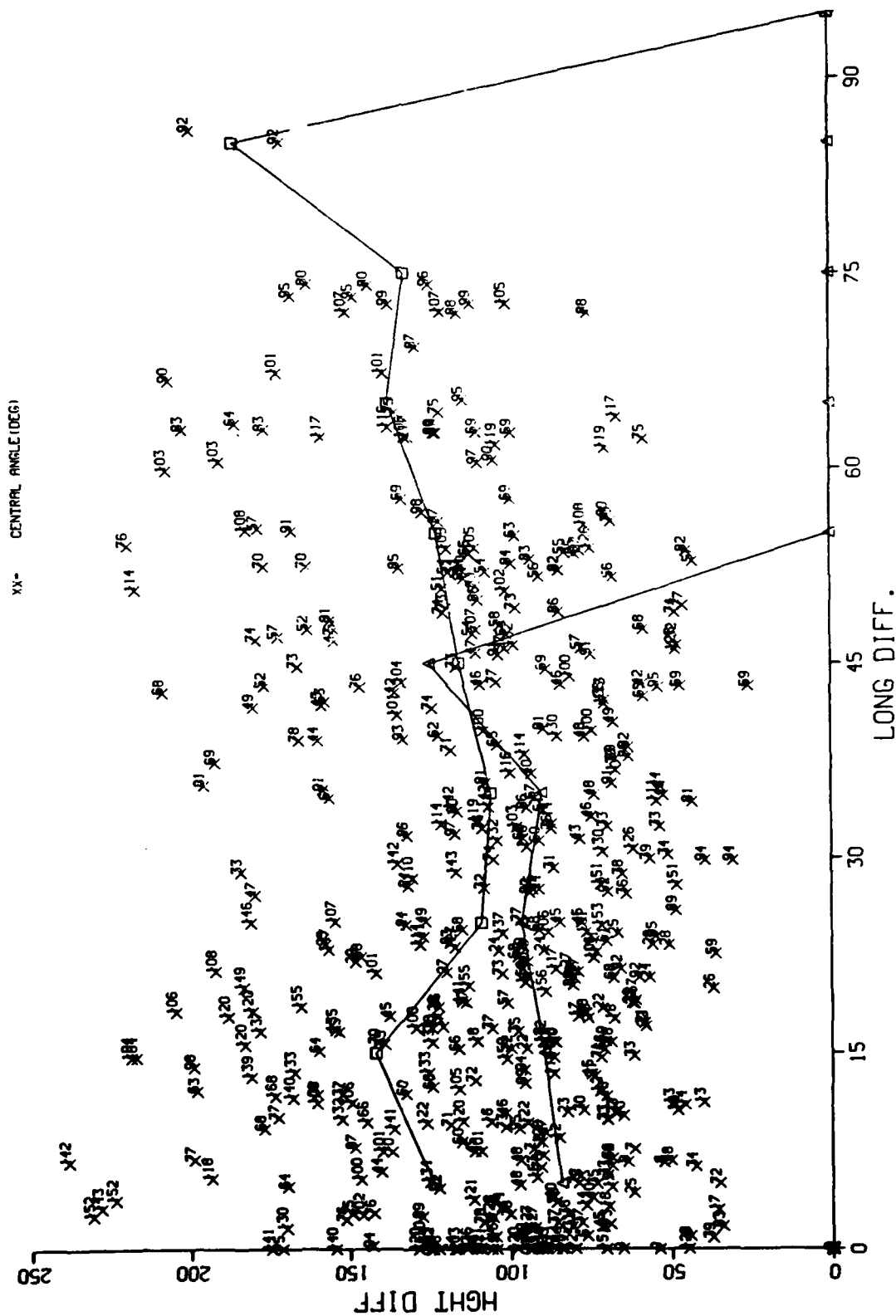


Figure 8E. Relative Height Residuals (CM). Semi Short Arc//90 Deg 6 Par

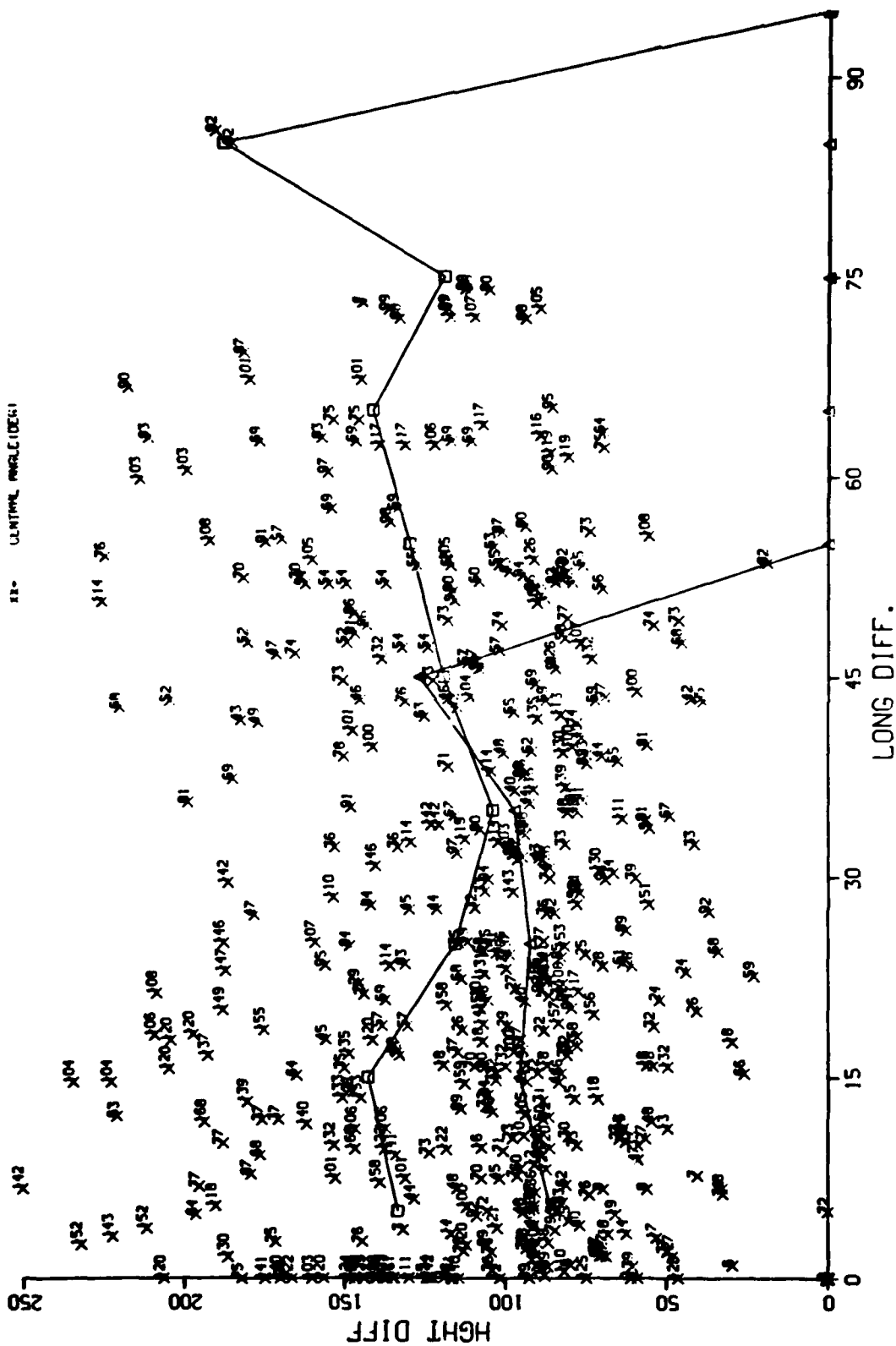


Figure 8F. Relative Height Residuals (CM). Semi Short Arc/1 Rev Fit

APPENDIX C

TABLES OF STANDARD DEVIATIONS
OF RELATIVE POSITIONS

Table 1A. Longitude Residuals Meters. Point Positions/Orbit Fixed

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-45.87	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	138.65	-106.73	-149.83	-1.38	-68.76
LATITUDE	-23.22	-77.85	32.73	50.80	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.18	76.54
1	8	.58	1.51	1.26	1.07	.74	.83	.87	1.34	.78	1.01	.83	1.34	.69	1.42
2	19	1.51	1.24	1.28	1.01	1.40	1.72	2.15	2.39	1.35	1.42	1.50	1.74	1.25	2.37
3	127	1.26	1.28	.77	.99	1.02	.64	2.07	2.08	1.51	.96	.96	1.00	.80	1.76
4	21	1.07	1.01	.99	.77	.96	1.19	2.01	1.68	1.38	1.04	.97	1.38	.80	1.63
5	31061	.74	1.40	1.02	.96	.56	.84	1.29	1.28	1.57	.68	.74	1.14	.56	2.06
6	23	.83	1.72	.64	1.19	.84	.62	1.52	1.51	1.36	.78	.92	.79	.82	1.67
7	24	.87	2.15	2.07	2.01	1.29	1.52	1.46	1.83	2.09	1.48	1.68	1.75	1.58	2.26
8	27	1.34	2.39	2.08	1.68	1.28	1.51	1.83	1.62	2.11	1.66	1.68	2.13	1.59	2.33
9	30682	.78	1.35	1.51	1.38	1.57	1.36	2.09	2.11	1.24	1.23	.99	1.57	1.07	1.36
10	107	1.01	1.42	.96	1.04	.66	.78	1.48	1.66	1.23	.75	1.07	1.27	.80	1.94
11	112	.83	1.50	.96	.97	.74	.92	1.68	1.68	.99	1.07	.56	.74	.57	1.68
12	113	1.34	1.74	1.00	1.38	1.14	.79	1.75	2.13	1.57	1.27	.74	.95	1.08	2.14
13	114	.69	1.25	.80	.80	.56	.82	1.58	1.59	1.07	.80	.57	1.08	.41	1.72
14	116	1.42	2.37	1.76	1.63	2.06	1.67	2.26	2.33	1.36	1.94	1.68	2.14	1.72	1.65
15	118	.57	1.01	1.08	.78	.62	.71	1.19	1.58	1.42	.48	1.01	1.31	.67	1.83
16	125	.83	1.38	.99	.94	1.24	.96	1.73	1.91	.95	1.12	.72	1.10	.80	1.32
17	128	1.41	1.23	1.01	1.18	1.71	1.32	1.87	2.41	1.23	1.45	1.07	1.20	1.22	1.51
18	192	1.45	1.60	1.22	1.44	.64	1.16	1.48	2.25	1.59	1.18	1.04	1.01	.92	2.36
19	310	.95	1.25	1.12	1.03	.88	1.13	1.46	2.17	1.83	1.03	1.03	1.03	1.01	2.11
20	320	1.27	1.40	1.99	1.19	1.63	1.49	1.52	2.25	1.49	1.30	1.31	1.32	1.42	2.05
21	330	.63	1.49	1.37	1.04	.49	1.10	1.28	1.47	1.13	1.03	.66	1.18	.74	1.92
22	340	.84	1.48	.86	.88	1.14	.85	1.62	1.80	1.13	1.14	.91	1.26	.87	1.16
23	31039	1.78	2.01	1.66	1.93	.76	1.76	2.39	2.58	2.19	1.88	1.74	1.89	1.62	2.12
24	10068	1.95	2.28	2.21	2.22	1.56	2.00	1.79	2.40	2.20	1.84	1.62	1.35	1.88	3.27
25	20073	.60	1.24	.80	.71	.95	.51	1.47	1.70	1.23	.72	.48	.97	.42	1.66
26	30121	.69	1.58	.78	.77	.68	.63	1.68	1.55	1.15	.94	.68	1.28	.48	1.44
27	30122	1.08	1.82	1.33	1.44	1.28	.55	1.66	1.79	.92	1.30	.87	.95	1.18	1.87
28	30130	1.01	1.17	1.31	1.14	1.02	.99	1.65	1.79	1.09	1.06	1.23	1.51	.86	1.73
29	30188	1.31	1.23	1.30	1.38	1.72	1.66	2.12	2.28	1.37	1.62	1.36	1.78	1.31	1.97
30	30280	1.42	1.71	.97	.93	.64	1.16	1.92	1.79	1.32	1.19	.82	.98	1.04	1.41
31	30800	1.20	1.48	1.13	1.39	.81	1.03	1.98	1.40	2.12	1.20	1.14	1.21	.98	2.43
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30280
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-158.00	-70.85
LATITUDE	50.87	45.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	.83	1.41	1.45	.95	1.27	.63	.84	1.78	1.95	.69	1.08	1.01	1.31	1.42
2	19	1.38	1.23	1.60	1.25	1.40	1.49	1.48	2.01	2.28	1.24	1.58	1.82	1.17	1.23
3	127	.99	1.01	1.22	1.12	1.59	1.37	.86	1.66	2.21	.80	.78	1.33	1.31	1.30
4	21	.94	1.18	1.44	1.03	1.19	1.04	.88	1.93	2.22	.71	.77	1.44	1.14	1.38
5	31061	1.24	1.71	.64	.88	1.63	.49	1.14	.76	1.56	.55	.68	1.28	1.02	1.72
6	23	.96	1.32	1.16	1.13	1.49	1.10	.85	1.76	2.00	.51	.63	.55	.99	1.66
7	24	1.73	1.87	1.48	1.46	1.52	1.28	1.62	2.39	1.79	1.47	1.68	1.66	1.65	2.12
8	27	1.91	2.41	2.25	2.17	2.25	1.47	1.80	2.58	2.40	1.70	1.55	1.79	1.79	2.28
9	30682	.95	1.23	1.59	1.83	1.49	1.13	1.15	2.19	2.20	1.23	1.15	.92	1.09	1.37
10	107	1.12	1.45	1.18	1.83	1.30	1.03	1.14	1.88	1.84	.72	.94	1.30	1.06	1.62
11	112	.72	1.07	1.04	1.03	1.31	.66	.91	1.74	1.62	.48	.68	.87	1.23	1.36
12	113	1.10	1.20	1.01	1.03	1.32	1.18	1.26	1.89	1.35	.97	1.28	.95	1.51	1.78
13	114	.80	1.22	.92	1.01	1.42	.74	.87	1.62	1.88	.42	.48	1.18	.86	1.31
14	116	1.32	1.51	2.36	2.11	2.05	1.92	1.16	2.12	3.27	1.86	1.44	1.87	1.73	1.57
15	118	.97	1.43	1.26	.87	1.14	.82	.93	1.79	1.77	.49	.83	1.17	.73	1.42
16	125	.71	.98	1.44	1.13	1.27	.99	.57	1.82	1.99	.68	.87	.62	1.29	1.26
17	128	.98	1.10	1.53	1.07	1.09	1.50	1.01	1.94	2.05	1.11	1.43	1.53	1.69	.92
18	192	1.44	1.53	1.07	1.17	1.73	1.25	1.62	1.86	1.52	1.10	1.30	1.64	1.29	1.80
19	310	1.13	1.07	1.17	.72	1.00	.96	.91	1.54	1.70	.74	1.14	1.37	1.12	1.44
20	320	1.27	1.09	1.73	1.00	1.18	1.25	1.41	2.38	1.75	1.21	1.69	1.37	1.40	1.94
21	330	.99	1.50	1.25	.96	1.23	.64	1.10	1.76	1.61	.57	.81	1.07	1.12	1.90
22	340	.57	1.01	1.62	.91	1.41	1.10	.66	1.57	2.25	.66	.85	1.13	1.32	1.15
23	31039	1.82	1.94	1.86	1.54	2.38	1.76	1.57	1.48	2.60	1.51	.99	1.94	1.72	1.98
24	10068	1.99	2.05	1.92	1.70	1.75	1.61	2.25	2.60	1.80	1.85	2.31	1.69	2.18	2.42
25	20073	.68	1.11	1.10	.74	1.21	.57	.66	1.51	1.85	.03	.55	.97	.74	1.28
26	30121	.87	1.43	1.30	1.14	1.69	.81	.85	.99	2.31	.55	.55	1.17	.61	1.43
27	30122	.82	1.53	1.64	1.37	1.37	1.07	1.13	1.94	1.69	.97	1.17	.98	1.49	1.89
28	30130	1.29	1.69	1.29	1.12	1.40	1.12	1.32	1.72	2.18	.74	.81	1.45	.85	1.94
29	30188	1.26	.92	1.80	1.44	1.54	1.50	1.15	1.58	2.42	1.28	1.45	1.85	1.54	1.22
30	30280	1.13	.88	1.21	1.24	1.23	1.27	1.17	2.44	1.61	1.02	1.13	1.49	1.77	1.68
31	30800	1.50	1.59	1.16	1.22	1.72	1.22	1.41	1.58	1.83	.88	1.23	1.28	1.26	1.59

Table 1B. Longitude Residuals Meters. Point Positions/Orbit Relaxed

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	10	127	21	31061	23	24	27	30682	107	112	113	114	116	118	119
LONGITUDE	-45.17	144.67	174.10	4.36	-67.73	144.67	-170.72	141.13	-77.31	-77.31	138.69	-106.75	-149.83	-1.38	-68.76
LATITUDE	-23.22	-77.45	52.73	50.66	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.18	76.94
1	1.00	1.00	1.12	1.31	1.13	1.45	1.06	1.37	1.46	1.16	1.07	1.25	1.04	2.00	1.04
2	1.55	1.12	1.02	1.15	1.38	2.03	1.77	2.20	1.14	1.18	1.36	1.37	1.25	2.46	1.21
3	1.12	1.07	.82	.93	.61	1.34	1.38	1.89	.80	1.03	.82	.82	.88	2.17	.97
4	1.31	1.15	.93	.87	.93	1.49	1.71	1.53	.99	1.28	1.13	1.14	.96	2.17	.79
5	1.13	1.38	.61	.93	.36	1.11	.59	1.26	.77	.76	.71	.58	.61	1.68	.48
6	1.45	2.03	1.34	1.49	1.11	1.25	1.52	1.90	.88	1.61	1.39	1.18	1.18	2.09	1.36
7	.96	1.78	1.34	1.71	.59	1.52	1.00	1.56	.69	1.06	1.02	1.24	.99	1.83	.98
8	1.37	2.20	1.89	1.53	1.26	1.90	1.56	1.51	1.26	1.98	1.36	1.03	1.45	2.74	1.38
9	.46	1.14	.80	.98	.77	.88	.69	1.26	.58	1.35	.38	1.22	.82	1.62	.89
10	1.16	1.18	1.03	1.28	.76	1.61	1.06	1.98	1.35	.89	1.24	.92	1.09	2.49	.76
11	.97	1.36	.82	1.13	.71	1.39	1.02	1.36	.38	1.24	.55	.93	.60	1.97	.91
12	1.25	1.37	.82	1.14	.58	1.18	1.24	1.83	1.22	.92	.93	.62	.86	2.63	.83
13	.94	1.25	.88	.96	.61	1.18	.99	1.45	.82	1.05	.60	.86	.43	1.91	.57
14	2.00	2.46	2.17	2.17	1.68	2.09	1.83	2.74	1.62	2.49	1.97	2.63	1.91	2.85	2.26
15	.84	1.21	.97	.79	.48	1.34	.96	1.38	.89	.76	.91	.83	.97	2.26	.50
16	1.21	1.00	1.02	1.04	.80	1.87	1.30	1.42	.99	1.22	.82	.99	.65	1.94	.79
17	1.24	.89	.81	1.05	1.10	1.62	1.44	2.13	.97	1.32	.98	1.18	.98	1.74	1.12
18	1.04	1.88	.89	1.20	.41	1.44	1.00	1.37	1.10	1.11	.74	.74	.64	2.34	.63
19	1.04	1.34	.97	1.00	.76	1.32	1.38	1.90	1.03	1.07	1.09	.99	.93	2.42	.85
20	1.02	1.35	1.24	1.15	.80	1.81	1.43	1.49	.56	1.13	1.12	.99	1.14	2.55	.92
21	1.13	1.57	1.14	1.22	.46	1.45	1.12	1.59	.59	1.28	.79	.79	.69	2.15	.87
22	1.37	1.42	.95	1.18	1.06	1.51	1.41	1.86	1.06	1.55	1.14	1.25	1.11	1.90	1.13
23	1.13	1.41	.89	1.47	.40	1.23	1.07	2.03	.83	1.16	.99	1.03	.83	1.96	1.05
24	1.068	1.17	.82	1.20	.72	1.71	1.34	1.67	1.16	1.26	.94	.73	1.11	2.42	.97
25	2.0073	.94	1.13	.68	.69	.35	1.20	1.57	.61	.75	.58	.67	.46	2.16	.50
26	30121	1.46	1.38	.93	.74	.75	1.14	1.11	.89	1.26	.78	.97	.78	2.09	1.07
27	30122	1.47	1.70	1.27	1.50	1.14	1.93	1.31	.85	1.39	1.13	1.16	1.41	2.45	1.29
28	30130	1.04	1.17	.86	1.03	.61	1.34	.99	1.70	1.03	.53	.60	.58	2.17	.51
29	30188	.99	1.26	1.07	1.35	1.20	1.46	1.50	1.82	.56	1.51	.93	1.49	2.11	1.20
30	30280	1.27	.93	.69	.59	.32	1.85	1.61	1.36	.74	.92	.78	.95	2.21	.93
31	30800	.88	1.36	.78	1.33	.81	1.33	.98	1.60	.82	1.14	.94	1.14	2.39	1.05

STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30280	30800
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-158.00	-70.85	100.59
LATITUDE	50.87	45.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62	13.79
1	1.00	1.24	1.04	1.04	1.02	1.13	1.37	1.13	1.17	.94	1.46	1.47	1.04	.99	1.27	.88
2	1.00	.89	1.48	1.34	1.35	1.57	1.42	1.41	1.52	1.13	1.38	1.70	1.12	1.26	.93	1.36
3	1.02	.81	.89	.87	1.24	1.14	.95	.89	.82	.68	.93	1.27	.86	1.07	.69	.78
4	1.04	1.05	1.20	1.00	1.15	1.22	1.18	1.47	1.20	.69	.74	1.50	1.03	1.35	.59	1.33
5	.80	1.10	.41	.76	.80	.46	1.06	.40	.72	.39	.79	1.14	.61	1.20	.32	.81
6	1.87	1.62	1.44	1.32	1.81	1.45	1.51	1.23	1.71	1.20	1.14	1.93	1.34	1.46	1.85	1.33
7	1.30	1.44	1.00	1.38	1.43	1.12	1.41	1.07	1.34	1.00	1.11	1.31	.99	1.50	1.61	.98
8	1.42	2.13	1.37	1.90	1.49	1.59	1.86	2.03	1.67	1.57	1.37	1.48	1.70	1.82	1.36	1.60
9	.99	.97	1.10	1.03	.56	.59	1.06	.63	1.16	.61	.89	.85	1.03	.56	.74	.42
10	1.07	1.32	1.11	1.07	1.13	1.28	1.55	1.16	1.26	.75	1.26	1.39	.53	1.51	.92	1.14
11	.82	.98	.74	1.09	1.12	.78	1.14	.99	.94	.58	.78	1.13	.93	.93	.78	.94
12	.99	1.18	.74	.59	.99	.79	1.25	1.03	.73	.67	.97	1.16	.60	1.49	.87	1.14
13	.65	.98	.64	.93	1.14	.69	1.11	.83	1.11	.46	.78	1.41	.58	1.00	.95	1.03
14	1.16	1.74	2.34	2.42	2.55	2.15	1.90	1.96	2.42	2.16	2.09	2.45	2.17	2.11	2.21	2.39
15	.79	1.12	.63	.85	.92	.87	1.13	1.05	.97	.50	1.07	1.29	.91	1.20	.93	1.05
16	.66	.85	.67	1.11	1.07	.81	1.10	1.18	1.06	.64	1.04	1.38	.82	1.18	.87	1.27
17	.85	.78	1.22	.92	1.06	1.09	1.06	.99	1.14	.77	1.03	1.58	.96	1.05	.90	1.19
18	.67	1.22	.58	.90	1.07	.65	1.16	.86	.76	.46	1.09	1.26	.81	1.30	.86	.93
19	1.11	.92	.90	.63	.81	.76	1.08	.89	.82	.66	1.16	1.52	.77	1.25	1.06	1.07
20	1.07	1.06	1.07	.81	.84	.94	1.42	1.41	1.01	.89	1.36	1.50	.89	1.32	1.06	1.22
21	.81	1.09	.65	.76	.94	.61	1.16	.90	.91	.59	.95	1.46	.86	1.19	1.30	1.20
22	1.10	1.06	1.16	1.08	1.42	1.16	.92	1.17	.98	.97	1.50	1.09	1.23	1.14	1.32	1.29
23	31039	1.18	.99	.86	.89	1.41	.90	1.17	.76	1.17	.77	1.07	1.61	.91	1.07	1.46
24	10068	1.06	1.14	.76	.82	1.01	.91	.98	1.17	.76	.59	1.25	.90	1.02	1.42	.86
25	20073	.64	.77	.46	.66	.89	.59	.97	.77	.59	.03	.76	1.21	.43	.97	.84
26	30121	1.04	1.03	1.09	1.16	1.36	.95	1.50	1.07	1.25	.76	1.40	.88	1.42	.58	1.13
27	30122	1.38	1.58	1.26	1.52	1.50	1.46	1.09	1.61	.90	1.21	1.40	1.17	1.35	1.52	1.41
28	30130	.82	.96	.81	.77	.89	.86	1.23	.91	1.02	.48	.88	1.35	.46	1.20	.89
29	30188	1.18	1.05	1.30	1.25	1.32	1.19	1.14	1.07	1.42	.97	1.42	1.52	1.20	.93	1.24
30	30280	.87	.90	.86	1.06	1.30	1.32	1.46	.86	.79	.98	1.41	.89	1.24	.78	1.11
31	30800	1.27	1.19	.93	1.07	1.22	1.20	1.29	.91	1.08	.84	1.13	1.14	1.03	1.18	.84

Table 1C. Longitude Residuals Meters. Semi Short Arc/Max Gap = 30 Deg.

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	19	127	21	31061	23	24	27	30602	107	112	113	114	116	118	119
LONGITUDE	-45.07	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	130.65	-106.75	-103.03	-1.30	-60.76
LATITUDE	-23.22	-77.05	52.73	50.00	30.30	13.44	-14.33	39.14	39.00	39.00	-34.67	32.20	61.20	51.10	76.54
1	8	1.99	1.40	1.33	1.67	1.01	1.44	1.04	1.50	2.71	1.13	1.04	1.76	.94	2.46
2	19	1.40	.97	1.06	1.27	1.60	1.62	1.05	2.10	2.09	.05	1.10	1.62	.95	2.64
3	127	1.33	1.06	.89	1.13	1.02	1.44	1.40	1.00	2.43	1.21	.92	.91	.66	2.62
4	21	1.67	1.27	1.13	1.04	1.36	1.56	2.02	1.92	2.39	1.10	1.23	1.59	1.04	1.45
5	31061	1.01	1.68	1.02	1.36	.75	1.11	1.23	1.02	2.75	1.43	.77	1.06	.84	2.15
6	23	1.44	1.63	1.44	1.56	1.11	1.29	1.60	2.13	2.70	1.64	1.42	2.01	1.14	2.03
7	24	1.04	1.05	1.00	2.02	1.23	1.60	1.27	1.95	2.94	1.43	1.50	1.67	1.36	2.67
8	27	1.50	2.10	1.00	1.92	1.02	2.13	1.95	1.66	3.11	2.09	1.35	1.65	1.04	2.03
9	30602	2.71	2.09	2.43	2.39	2.75	2.70	2.94	3.11	2.23	1.97	2.23	2.05	.33	1.76
10	107	1.13	.05	1.21	1.11	1.43	1.04	1.43	2.09	1.97	.79	1.22	1.63	.01	2.97
11	112	1.04	1.10	.92	1.23	.77	1.42	1.50	1.35	2.23	1.22	.54	1.00	.63	2.31
12	113	1.76	1.62	.91	1.59	1.06	2.11	1.67	1.65	2.05	1.63	1.00	1.13	1.25	3.00
13	114	.94	.95	.66	1.04	.04	1.14	1.36	1.04	.33	.01	.63	1.25	.19	2.90
14	116	2.46	2.64	2.62	1.45	2.15	2.03	2.67	2.03	1.76	2.97	2.31	3.00	2.90	2.43
15	118	.94	1.17	1.54	1.26	.00	1.26	1.32	1.54	2.25	.79	1.09	1.72	.56	2.63
16	125	1.40	.84	1.13	1.42	1.69	1.75	1.70	2.05	1.45	.06	1.09	1.44	.94	2.34
17	127	1.72	.80	1.30	1.26	2.01	1.74	2.03	2.47	2.06	1.34	1.27	1.71	1.16	2.00
18	192	1.23	1.40	1.05	1.36	.70	1.50	1.30	1.62	2.33	1.24	.90	1.00	.66	2.75
19	310	1.31	1.45	1.19	1.06	1.09	1.71	1.41	2.00	2.52	.67	1.20	1.44	.66	3.03
20	320	1.49	1.45	1.29	1.39	.30	2.20	1.70	1.37	2.73	1.26	1.05	1.16	1.25	2.03
21	330	1.03	1.10	1.10	1.22	1.01	1.26	1.30	1.76	1.72	.01	.79	1.44	.37	2.25
22	340	1.50	1.36	.99	1.29	1.24	1.56	2.07	1.76	2.77	1.03	.93	1.15	1.13	2.31
23	31039	2.12	2.03	2.11	2.40	.48	1.77	2.20	2.96	1.02	2.07	1.77	2.13	1.75	2.63
24	10060	1.31	1.11	.99	.90	.92	1.94	1.40	1.70	2.65	.96	.95	.09	.94	2.92
25	20073	1.02	.90	.90	.00	.72	1.14	1.35	1.74	2.44	.05	.50	1.05	.10	2.59
26	30121	1.46	1.06	.79	1.04	1.11	1.16	1.40	1.23	2.20	1.32	.72	1.04	.00	2.34
27	30122	1.35	1.36	1.34	1.56	1.06	1.60	1.34	1.55	2.93	1.29	.90	1.06	1.03	2.02
28	30130	1.07	1.14	1.02	1.19	1.10	1.22	1.04	1.70	2.09	.79	.02	1.39	.40	2.25
29	30100	1.36	1.27	1.65	2.05	1.56	1.63	2.05	2.39	2.70	1.67	1.47	2.03	1.02	2.41
30	30200	1.43	1.16	.52	.79	.69	2.14	1.71	1.32	2.49	.94	.09	1.10	1.04	2.00
31	30000	.03	1.24	.09	1.51	.74	1.22	1.10	1.60	3.02	1.22	.91	1.25	.51	2.76
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10060	20073	30121	30122	30130	30100	30200
LONGITUDE	-114.29	-75.92	-97.73	-60.01	-93.00	-119.07	-150.00	-105.12	-14.40	144.61	-70.42	-57.61	33.73	-150.00	-70.05
LATITUDE	50.07	45.40	30.30	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	1.40	1.72	1.23	1.31	1.49	1.03	1.50	2.12	1.31	1.02	1.46	1.35	1.07	1.43
2	19	.04	.00	1.40	1.45	1.45	1.10	1.36	2.03	1.11	.90	1.06	1.36	1.14	1.27
3	127	1.13	1.10	1.05	1.19	1.29	1.10	.99	2.11	.99	.90	.79	1.34	1.02	1.65
4	21	1.42	1.26	1.36	1.06	1.39	1.22	1.29	2.40	.90	.00	1.04	1.56	1.19	2.05
5	31061	1.69	2.01	.70	1.09	.30	1.01	1.24	.40	.92	.72	1.11	1.06	1.10	1.56
6	23	1.75	1.74	1.50	1.71	2.20	1.26	1.56	1.77	1.94	1.14	1.16	1.60	1.22	1.63
7	24	1.70	2.03	1.30	1.41	1.70	1.30	2.07	2.20	1.40	1.35	1.40	1.34	1.04	2.05
8	27	2.05	2.47	1.62	2.00	1.37	1.76	1.76	2.96	1.70	1.74	1.23	1.55	1.70	2.39
9	30602	1.45	2.06	2.33	2.52	2.73	1.72	2.77	1.02	2.65	2.44	2.20	2.93	2.09	2.70
10	107	.06	1.34	1.24	.07	1.26	.01	1.03	2.07	.96	.05	1.32	1.29	.79	1.67
11	112	1.09	1.27	.90	1.20	1.05	.79	.93	1.77	.95	.50	.72	.90	.02	1.47
12	113	1.44	1.71	1.00	1.44	1.16	1.44	1.15	2.13	.89	1.05	1.04	1.06	1.39	2.03
13	114	.94	1.16	.06	.06	1.25	.37	1.13	1.75	.94	.10	.00	1.03	.40	1.02
14	116	2.34	2.00	2.75	3.03	2.83	2.25	2.31	2.63	2.92	2.59	2.34	2.02	2.25	2.41
15	118	1.10	1.50	1.22	1.20	1.46	.62	1.77	1.02	1.14	.77	1.36	1.14	.93	1.59
16	125	.93	1.04	1.32	1.47	1.34	.00	1.47	1.90	1.01	.99	1.09	1.29	1.07	1.57
17	128	1.04	1.13	1.63	1.50	1.31	1.20	1.30	2.06	1.26	1.16	1.27	1.71	1.16	1.59
18	192	1.32	1.63	.70	.90	1.25	.06	1.43	1.59	.93	.73	1.06	1.44	.92	1.67
19	310	1.47	1.50	.90	.79	1.12	.99	1.00	1.94	.05	.04	1.52	1.41	.00	2.03
20	320	1.34	1.31	1.25	1.11	1.01	1.34	1.63	2.59	.66	.90	1.23	.96	1.16	2.02
21	330	.00	1.20	.06	.99	1.34	.51	1.49	1.46	.90	.49	1.12	1.27	.64	1.55
22	340	1.47	1.30	1.43	1.00	1.63	1.49	1.22	2.11	1.46	1.32	.02	1.44	1.50	1.55
23	31039	1.90	2.06	1.59	1.94	2.59	1.46	2.11	1.63	2.03	1.50	1.45	2.30	1.79	1.73
24	10060	1.01	1.26	.93	.05	.66	.90	1.46	2.03	.60	.52	1.01	.02	.94	1.00
25	20073	.99	1.16	.73	.04	.90	.49	1.32	1.50	.52	.03	.09	.99	.49	1.54
26	30121	1.09	1.27	1.06	1.52	1.23	1.12	.02	1.45	1.01	.09	.02	1.06	.90	1.66
27	30122	1.29	1.71	1.44	1.41	.96	1.27	1.44	2.30	.02	.99	1.06	.95	1.17	1.70
28	30130	1.07	1.16	.92	.00	1.16	.64	1.50	1.79	.94	.49	.90	1.17	.50	1.72
29	30100	1.57	1.59	1.07	2.03	2.02	1.55	1.55	1.73	1.00	1.54	1.66	1.70	1.72	1.43
30	30200	.96	.95	.90	.96	.03	1.10	1.29	2.45	.50	.07	1.00	1.31	1.09	2.05
31	30000	1.41	1.62	.90	1.20	1.37	1.15	1.23	1.07	1.16	.04	1.01	1.03	.90	1.45

Table 1D. Longitude Residuals Meters. Semi Short Arc/Max Gap = 90 Deg.

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	1	19	127	21	31061	23	24	27	30602	107	112	113	114	116	118
LONGITUDE	-45.07	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	130.65	-106.75	-149.03	-1.30	-60.76
LATITUDE	-23.22	-77.05	52.73	50.00	30.30	13.44	-14.33	39.14	39.00	39.00	-34.67	32.20	61.20	51.10	76.54
1	0	.05	.60	1.15	1.64	1.20	1.43	1.06	1.71	.91	1.13	1.34	1.50	.81	2.40
2	19	.64	1.50	1.45	1.50	1.35	1.63	2.30	1.90	1.62	1.33	1.41	1.56	.90	2.17
3	127	1.15	1.45	.82	1.70	1.36	1.81	1.73	1.75	1.99	.97	1.06	1.27	1.15	1.94
4	21	1.64	1.50	1.70	1.25	1.38	1.94	2.91	1.95	1.90	1.67	1.53	1.63	.99	2.00
5	31061	1.20	1.35	1.36	1.30	.02	.72	1.12	1.10	1.96	1.27	.93	1.04	.00	2.10
6	23	1.43	1.63	1.01	1.94	.72	1.03	1.09	1.59	2.14	1.29	1.02	1.55	1.30	1.04
7	24	1.06	2.30	1.73	2.91	1.12	1.09	1.70	2.26	2.26	1.46	1.04	2.00	2.12	2.19
8	27	1.71	1.90	1.75	1.95	1.10	1.59	2.26	1.57	2.31	1.05	1.61	1.64	1.55	2.14
9	30602	.91	1.62	1.09	1.90	1.96	2.14	2.26	2.31	1.40	1.50	1.61	1.90	1.17	1.56
10	107	1.13	1.33	.97	1.67	1.27	1.29	1.46	1.05	1.50	.01	1.02	1.30	1.10	1.93
11	112	1.34	1.41	1.06	1.53	.93	1.02	1.04	1.61	1.61	1.02	.99	.91	.06	1.06
12	113	1.50	1.56	1.27	1.62	1.04	1.55	2.00	1.64	1.90	1.30	.91	1.07	1.23	2.30
13	114	.01	.90	1.15	.99	.00	1.30	2.12	1.55	1.17	1.10	.06	1.23	.51	1.01
14	116	2.40	2.17	1.94	2.00	2.10	1.04	2.19	2.14	1.56	1.93	1.06	2.30	1.01	1.71
15	118	.91	1.19	1.00	1.37	.91	1.35	1.52	1.66	1.56	.91	1.11	1.47	.00	1.90
16	125	1.12	1.12	1.27	1.40	1.70	1.60	2.00	1.93	.56	1.14	1.21	1.36	.01	1.52
17	120	1.64	1.44	1.09	1.00	2.20	1.59	1.50	2.14	1.90	1.35	1.44	1.64	1.50	1.09
18	192	1.35	1.54	1.52	1.69	.69	1.41	1.72	1.02	1.50	1.35	1.01	1.14	1.14	2.20
19	310	1.11	1.34	1.23	1.52	1.25	1.45	1.70	2.00	1.00	.94	1.00	1.47	1.05	2.27
20	320	1.13	1.19	1.24	1.45	.36	1.05	1.04	1.74	1.77	1.19	1.23	.91	1.06	2.09
21	330	1.14	1.25	1.05	1.36	1.05	1.23	1.73	1.63	1.01	1.00	.00	1.26	.57	1.50
22	340	1.10	1.36	.65	1.60	1.35	.92	1.79	1.02	1.94	1.00	.07	2.36	1.01	1.70
23	31039	1.79	2.07	2.10	2.30	.05	1.72	2.77	2.95	2.69	2.10	1.67	2.03	1.93	2.53
24	10060	1.10	1.54	1.55	1.61	1.20	2.00	2.12	1.74	1.37	1.27	1.33	1.00	1.01	2.66
25	20073	.09	1.00	.05	1.21	.00	1.00	1.70	1.64	1.50	.60	.61	1.04	.51	1.73
26	30121	1.90	1.92	1.16	1.93	1.93	1.53	1.34	2.24	1.34	1.16	1.44	1.72	1.62	1.04
27	30122	1.11	1.27	.60	1.57	1.25	1.07	1.67	1.69	.32	.02	.05	1.23	.73	1.03
28	30130	1.33	1.31	1.01	1.12	1.14	1.10	1.03	1.56	1.50	.06	.09	1.22	.06	1.40
29	30100	1.31	1.17	1.70	1.97	1.00	1.70	2.61	2.51	2.05	1.91	1.60	1.97	1.50	1.92
30	30200	1.32	1.41	1.29	1.00	.74	2.03	1.93	1.01	2.73	1.27	1.77	1.43	1.40	2.44
31	30000	1.09	1.20	1.14	1.74	.75	1.14	1.74	1.66	2.17	1.20	1.10	1.30	1.13	2.40
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	120	192	310	320	330	340	31039	10060	20073	30121	30122	30130	30100	30200
LONGITUDE	-114.29	-75.92	-97.73	-60.01	-93.00	-119.07	-150.00	-105.12	-14.40	144.61	-70.42	-57.61	33.73	-150.00	-70.05
LATITUDE	50.07	45.40	30.30	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	0	1.12	1.64	1.35	1.11	1.13	1.14	1.10	1.79	1.10	.09	1.90	1.11	1.33	1.31
2	19	1.12	1.44	1.54	1.34	1.19	1.25	1.36	2.07	1.54	1.00	1.92	1.27	1.31	1.17
3	127	1.27	1.09	1.52	1.23	1.24	1.05	.65	2.10	1.55	.05	1.16	.60	1.01	1.70
4	21	1.40	1.00	1.69	1.52	1.45	1.36	1.60	2.30	1.61	1.21	1.93	1.57	1.12	1.97
5	31061	1.70	2.20	.69	1.25	.36	1.05	1.35	.05	1.20	.00	1.93	1.25	1.14	1.00
6	23	1.64	1.59	1.41	1.45	1.05	1.23	.92	1.72	2.00	1.00	1.53	1.07	1.10	1.70
7	24	2.00	1.50	1.72	1.70	1.04	1.73	1.79	2.77	2.12	1.70	1.34	1.07	1.03	2.61
8	27	1.93	2.14	1.02	2.00	1.74	1.63	1.02	2.95	1.74	1.64	2.24	1.69	1.56	2.51
9	30602	.56	1.90	1.50	1.00	1.77	1.01	1.94	2.69	1.37	1.50	1.34	.32	1.50	2.05
10	107	1.14	1.35	1.35	.94	1.19	1.00	1.00	2.10	1.27	.60	1.16	.02	.06	1.91
11	112	1.21	1.44	1.01	1.00	1.23	.60	.07	1.67	1.33	.61	1.44	.05	.00	1.60
12	113	1.36	1.64	1.14	1.47	.91	1.26	1.36	2.03	1.00	1.04	1.72	1.23	1.22	1.97
13	114	.01	1.50	1.14	1.05	1.06	.57	1.01	1.93	1.01	.51	1.62	.73	.06	1.50
14	116	1.52	1.09	2.20	2.27	2.09	1.50	1.70	2.53	2.66	1.73	1.04	1.03	1.40	1.92
15	118	1.11	1.63	1.06	.95	1.19	.71	1.20	2.10	1.10	.66	1.71	.06	.00	1.00
16	125	.02	1.17	1.37	1.49	1.15	.03	1.10	2.27	1.21	.93	1.10	.01	1.01	1.54
17	120	1.17	1.25	1.79	1.63	1.01	1.46	1.23	2.30	1.95	1.32	.64	1.62	1.22	1.40
18	192	1.37	1.79	.90	1.21	1.24	1.06	1.40	1.73	1.26	1.01	1.79	1.54	1.10	1.90
19	310	1.49	1.63	1.21	.00	1.17	.94	1.21	1.70	1.32	.02	1.77	.09	1.01	1.92
20	320	1.15	1.01	1.24	1.17	.94	1.19	1.42	2.36	.90	.91	1.30	1.10	1.00	1.79
21	330	.03	1.46	1.06	.94	1.19	.47	.90	1.91	1.16	.50	1.41	.50	.03	1.64
22	340	1.10	1.23	1.40	1.21	1.42	.90	.76	1.62	1.64	.00	1.36	.97	1.17	1.24
23	31039	2.27	2.30	1.73	1.70	2.36	1.91	1.62	1.73	2.37	1.76	2.13	2.02	2.10	1.64
24	10060	1.21	1.95	1.26	1.32	.90	1.16	1.64	2.37	1.14	1.13	2.00	1.16	1.37	2.12
25	20073	.93	1.32	1.01	.02	.91	.50	.00	1.76	1.13	.03	1.34	.03	.67	1.51
26	30121	1.10	.64	1.79	1.77	1.30	1.41	1.36	2.13	2.00	1.34	1.32	1.45	1.16	1.06
27	30122	.01	1.62	1.54	.09	1.10	.50	.97	2.02	1.16	.63	1.45	.63	1.07	1.95
28	30130	1.01	1.22	1.10	1.01	1.08	.03	1.17	2.10	1.37	.67	1.16	1.07	.65	1.00
29	30100	1.54	1.40	1.90	1.92	1.79	1.64	1.24	1.64	2.12	1.51	1.06	1.95	1.00	1.45
30	30200	1.62	1.54	1.00	1.69	1.06	1.74	1.73	3.09	1.13	1.52	1.00	1.43	1.47	2.26
31	30000	1.41	1.09	1.21	1.45	1.47	1.22	1.22	1.69	1.54	.92	2.03	1.30	1.27	1.50

Table 1E. Longitude Residuals Meters. Semi Short Arc/90 Deg. 6 Par

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30602	107	112	113	114	116	110
LONGITUDE	-45.67	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	130.65	-106.75	-149.03	-1.30	-60.76
LATITUDE	-23.22	-77.05	52.73	50.80	38.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.10	76.54
1	8	.97	1.46	1.37	1.94	1.13	1.00	1.12	1.62	1.54	.97	.84	1.70	.92	2.11
2	19	1.46	1.43	1.51	1.70	1.96	1.57	2.30	2.20	1.66	1.29	1.67	1.99	1.42	2.90
3	127	1.37	1.51	.74	1.44	1.16	.88	1.85	2.08	2.17	1.22	.87	1.83	.92	2.24
4	21	1.94	1.70	1.44	1.20	1.19	1.92	2.66	2.25	2.28	1.40	1.77	1.52	1.19	2.77
5	31061	1.13	1.96	1.16	1.19	.80	.98	1.42	.97	2.13	1.32	.98	1.87	.85	1.90
6	23	1.08	1.57	.88	1.92	.98	1.11	1.61	1.00	2.55	1.12	1.15	1.59	1.23	2.63
7	24	1.12	2.30	1.05	2.66	1.42	1.61	1.70	2.04	2.79	1.56	1.51	2.02	1.07	2.70
8	27	1.62	2.20	2.18	2.25	.97	1.00	2.04	1.79	2.98	1.93	1.63	1.95	1.61	2.02
9	30602	1.54	1.66	2.17	2.20	2.13	2.55	2.79	2.90	1.63	1.66	1.52	2.12	1.20	1.62
10	107	.97	1.29	1.22	1.40	1.32	1.12	1.56	1.93	1.66	.76	1.05	1.40	.77	2.60
11	112	.84	1.67	.87	1.77	.98	1.15	1.51	1.63	1.52	1.05	.62	1.15	.71	1.95
12	113	1.70	1.99	1.03	1.52	1.07	1.59	2.02	1.95	2.12	1.40	1.15	.96	1.15	2.73
13	114	.92	1.42	.52	1.19	.85	1.23	1.87	1.81	1.20	.77	.71	1.15	.31	2.17
14	116	2.11	2.90	2.24	2.77	1.90	2.63	2.70	2.82	1.62	2.60	1.95	2.73	2.17	2.19
15	110	.89	1.32	1.22	1.24	.88	1.14	1.74	1.82	1.71	.66	.91	1.39	.44	2.55
16	125	1.04	1.48	.34	1.37	.93	.92	2.02	2.11	.34	.77	.72	1.07	.35	2.28
17	120	1.70	1.39	1.20	1.69	2.20	1.79	1.73	2.65	1.89	1.45	1.35	1.61	1.32	1.90
18	192	1.21	1.93	1.26	1.57	.69	1.52	1.76	1.80	1.62	1.24	.89	1.12	.76	2.42
19	310	1.30	1.63	1.18	1.23	1.13	1.50	1.66	2.17	2.18	1.10	1.24	1.11	1.05	2.99
20	320	1.52	1.70	1.45	1.40	.40	1.02	1.99	1.50	2.01	1.10	1.23	1.09	1.14	2.63
21	330	1.14	1.65	1.27	1.49	1.21	1.60	1.82	2.13	.97	.91	.81	1.26	.52	2.13
22	340	1.38	2.06	1.67	2.07	1.71	1.81	2.97	2.41	2.23	1.96	1.66	2.04	1.60	1.61
23	31039	2.00	2.36	1.48	2.02	.89	1.65	2.42	2.75	2.87	1.95	1.69	1.69	1.67	2.40
24	10060	1.89	2.03	1.57	1.84	1.57	1.89	2.21	2.00	1.77	1.61	1.37	1.22	1.27	3.02
25	20073	.81	1.45	.75	1.21	.80	.89	1.66	1.87	1.64	.78	.64	.89	.33	2.19
26	30121	1.25	1.61	1.02	1.54	1.21	1.34	1.50	1.70	1.64	1.19	1.01	1.17	.90	2.07
27	30122	.88	1.70	1.17	1.73	1.06	.93	1.50	1.74	1.91	.86	.71	1.21	.86	2.23
28	30130	1.16	1.05	1.55	1.61	1.35	1.67	1.71	2.22	1.11	1.00	1.21	1.54	.95	2.70
29	30100	1.47	1.49	1.56	2.13	1.66	1.63	2.49	2.60	2.15	1.75	1.46	2.10	1.45	2.02
30	30200	1.70	1.94	1.18	1.10	.89	1.00	2.05	1.73	1.44	1.19	1.33	1.25	1.81	1.70
31	30000	.90	1.40	1.00	1.49	.73	.81	1.54	1.55	.66	.75	.84	1.05	.64	2.70
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10060	20073	30121	30122	30130	30100	30200
LONGITUDE	-114.29	-75.92	-97.73	-60.01	-93.00	-119.07	-150.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-150.00	-70.05
LATITUDE	50.87	45.40	30.38	44.48	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	1.00	1.70	1.21	1.38	1.52	1.14	1.30	2.00	1.89	.81	1.25	.80	1.16	1.47
2	19	1.40	1.39	1.93	1.63	1.70	1.65	2.06	2.36	2.03	1.45	1.61	1.70	1.85	1.49
3	127	.34	1.20	1.26	1.10	1.45	1.27	1.67	1.40	1.57	.75	1.02	1.17	1.55	1.56
4	21	1.37	1.69	1.57	1.23	1.40	1.49	2.07	2.02	1.84	1.21	1.54	1.73	1.61	2.13
5	31061	.93	2.20	.69	1.13	.40	1.21	1.71	.89	1.57	.80	1.21	1.06	1.35	1.66
6	23	.92	1.79	1.52	1.50	1.82	1.60	1.81	1.65	1.89	.89	1.34	.93	1.67	1.63
7	24	2.02	1.73	1.76	1.66	1.99	1.82	2.97	2.42	2.21	1.66	1.58	1.58	1.71	2.49
8	27	2.11	2.65	1.88	2.17	1.50	2.13	2.41	2.75	2.80	1.87	1.70	1.74	2.22	2.60
9	30602	.34	1.89	1.62	2.18	2.81	.97	2.23	2.87	1.77	1.64	1.64	1.91	1.11	2.15
10	107	.77	1.45	1.24	1.10	1.18	.91	1.96	1.95	1.61	.78	1.19	.86	1.00	1.75
11	112	.72	1.35	.89	1.24	1.23	.81	1.66	1.69	1.37	.64	1.01	.71	1.21	1.46
12	113	1.07	1.61	1.12	1.11	1.09	1.26	2.04	1.69	1.22	.89	1.17	1.21	1.54	2.10
13	114	.35	1.32	.76	1.05	1.14	.52	1.60	1.67	1.27	.33	.90	.86	.95	1.45
14	116	2.20	1.90	2.42	2.99	2.63	2.13	1.61	2.48	3.02	2.19	2.07	2.23	2.70	2.02
15	110	.67	1.66	.82	1.23	1.29	.72	1.83	1.66	1.67	.50	.90	.97	.93	1.62
16	125	.33	1.00	.93	1.11	1.20	.50	1.55	1.20	1.20	.34	1.04	.71	1.02	1.45
17	120	1.80	1.25	1.82	1.23	1.30	1.44	1.50	2.26	1.60	1.31	1.61	1.54	1.70	1.64
18	192	.93	1.82	.75	1.27	1.27	.74	1.90	1.50	1.52	.75	1.02	1.10	1.84	1.20
19	310	1.11	1.23	1.27	.93	1.05	1.23	2.42	1.89	1.27	.95	1.65	1.37	1.11	2.00
20	320	1.20	1.30	1.27	1.05	.97	1.16	2.19	2.25	1.59	.91	1.44	.76	1.32	1.97
21	330	.50	1.44	.70	1.23	1.16	.63	1.80	1.71	1.66	.65	1.80	.90	.76	1.63
22	340	1.55	1.50	1.90	2.42	2.19	1.80	1.62	1.70	2.66	1.63	1.56	1.75	2.20	1.30
23	31039	1.20	2.26	1.50	1.89	2.25	1.71	1.70	1.50	2.49	1.52	1.36	1.07	1.96	1.50
24	10060	1.29	1.60	1.52	1.27	1.59	1.66	2.66	2.49	1.43	1.30	1.00	1.02	1.69	2.57
25	20073	.34	1.31	.75	.95	.91	.65	1.63	1.52	1.38	.83	.82	.70	.99	1.55
26	30121	1.84	1.61	1.02	1.65	1.44	1.00	1.56	1.36	1.88	.82	.82	1.27	1.62	1.61
27	30122	.71	1.54	1.18	1.37	.76	.98	1.75	1.87	1.82	.70	1.27	.70	1.20	1.69
28	30130	1.82	1.70	1.10	1.11	1.32	.76	2.28	1.96	1.69	.99	1.62	1.20	.98	2.02
29	30100	1.45	1.64	1.84	2.00	1.97	1.63	1.30	1.58	2.57	1.55	1.61	1.69	2.02	1.52
30	30200	.97	1.27	1.20	1.25	1.27	1.30	1.59	2.48	1.04	.94	.96	1.30	1.74	2.25
31	30000	.87	1.66	.85	1.11	1.07	.82	1.06	1.43	1.51	.50	.80	.96	.95	1.79

Table 1F. Longitude Residuals Meters. Semi Short Arc/1 Rev Fit

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-45.87	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	130.65	-106.75	-149.83	-1.78	-68.76
LATITUDE	-23.22	-77.85	52.73	50.80	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.26	51.18	76.54
1	8	1.69	1.17	1.58	1.24	1.02	1.41	1.59	1.12	1.09	1.09	1.64	1.22	2.01	.95
2	19	1.69	1.42	1.30	1.58	2.06	1.48	2.08	2.28	1.41	1.36	1.51	1.89	1.57	2.99
3	127	1.17	1.30	.65	1.19	1.20	.88	2.21	2.07	1.01	.99	1.00	1.01	1.04	2.49
4	21	1.58	1.58	1.19	1.01	1.29	1.50	2.44	1.94	1.38	1.29	1.41	1.58	1.21	2.45
5	31061	1.24	2.06	1.20	1.29	.75	.73	1.46	1.20	.59	.87	1.16	1.09	1.04	2.04
6	23	1.02	1.48	.88	1.50	.73	.91	1.88	1.69	.62	.85	1.28	1.56	1.28	2.42
7	24	1.41	2.08	2.21	2.44	1.46	1.88	1.78	2.25	1.80	1.55	1.91	2.23	1.98	3.12
8	27	1.59	2.20	2.07	1.94	1.20	1.69	2.25	1.77	1.16	1.69	1.75	1.97	2.03	2.85
9	30682	1.12	1.41	1.01	1.38	.59	.62	1.80	1.16	.72	1.04	.67	.78	.70	1.90
10	107	1.09	1.36	.99	1.29	.87	.85	1.55	1.69	1.04	.73	1.06	1.39	.96	2.47
11	112	1.09	1.51	1.00	1.41	1.16	1.28	1.91	1.75	.67	1.06	.67	.93	.83	1.93
12	113	1.64	1.89	1.01	1.59	1.09	1.56	2.23	1.97	.78	1.39	.83	1.00	1.24	2.60
13	114	1.22	1.57	1.04	1.21	1.04	1.28	1.98	2.03	.70	.96	.83	1.24	.73	1.97
14	116	2.01	2.99	2.49	2.45	2.04	2.42	3.12	2.85	1.90	2.47	1.93	2.60	1.97	2.13
15	118	.95	1.39	1.01	.92	.52	.77	1.63	1.59	.78	.48	1.02	1.33	.79	2.44
16	125	1.01	1.58	.43	1.23	.97	.92	2.04	2.10	.88	.99	.46	.92	.48	2.10
17	128	1.30	1.21	.95	1.31	1.86	1.35	1.61	2.33	1.80	1.22	.89	1.34	1.11	1.83
18	192	1.28	1.92	1.27	1.46	.70	1.46	1.68	1.97	1.12	1.16	1.11	1.15	.82	2.64
19	310	1.34	1.77	1.20	1.38	.90	1.33	1.43	2.09	1.28	1.14	1.33	1.28	1.37	2.89
20	320	1.71	1.66	1.47	1.38	1.70	1.95	2.01	2.32	1.80	1.37	1.17	1.30	1.51	2.63
21	330	1.41	1.75	1.14	1.36	1.30	1.48	1.88	2.24	1.04	1.14	.79	1.13	.86	1.80
22	340	1.22	2.10	1.55	1.76	1.80	1.63	3.18	2.18	1.28	1.89	1.54	1.92	1.49	1.53
23	31039	1.96	2.33	1.48	1.94	.77	1.53	2.61	2.79	.80	1.93	1.92	1.89	1.66	2.22
24	10068	1.49	1.69	1.27	1.73	1.35	1.72	1.94	2.14	1.61	1.28	1.11	.83	1.37	3.10
25	20073	1.03	1.38	.70	.80	.74	.60	1.85	1.84	.80	.64	.67	.69	.77	2.21
26	30121	1.76	2.15	1.53	1.58	1.11	1.31	2.06	1.07	1.30	1.47	1.42	1.46	1.64	2.58
27	30122	1.39	1.69	1.34	1.62	1.51	1.66	1.62	1.86	1.30	1.26	1.02	1.13	1.73	2.49
28	30130	1.71	1.77	1.44	1.47	.99	1.49	2.54	2.12	1.18	.96	1.35	1.40	1.04	2.84
29	30188	1.28	1.29	1.10	1.64	1.82	1.45	2.43	2.87	1.37	1.64	1.48	1.93	1.37	1.98
30	30280	1.42	1.79	1.12	.91	.70	1.72	2.17	1.92	0.00	1.15	.92	1.12	1.05	1.91
31	30800	1.16	1.77	1.31	1.53	1.24	.89	1.93	1.56	.16	1.40	1.60	1.74	1.65	2.89
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30280
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-158.00	-70.85
LATITUDE	50.67	44.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-10	-25.30	35.00	21.31	-33.62
1	8	1.01	1.30	1.28	1.34	1.71	1.41	1.22	1.96	1.49	1.03	1.76	1.39	1.71	1.28
2	19	1.58	1.21	1.92	1.77	1.66	1.75	2.10	2.33	1.69	1.38	2.15	1.69	1.77	1.29
3	127	.43	.95	1.27	1.20	1.47	1.14	1.55	1.48	1.27	.70	1.53	1.34	1.44	1.10
4	21	1.23	1.31	1.46	1.38	1.38	1.36	1.76	1.94	1.73	.80	1.58	1.92	1.47	1.64
5	31061	.97	1.86	.70	.90	1.70	1.30	1.80	.77	1.35	.74	1.11	1.51	.99	1.82
6	23	.92	1.35	1.46	1.33	1.95	1.48	1.63	1.53	1.72	.60	1.31	1.06	1.49	1.45
7	24	2.04	1.61	1.68	1.43	2.01	1.88	3.18	2.61	1.94	1.85	2.08	1.62	1.54	2.43
8	27	2.10	2.33	1.97	2.09	2.32	2.24	2.18	2.79	2.14	1.84	1.07	1.86	2.12	2.47
9	30682	.88	1.80	1.12	1.28	1.80	1.04	1.28	.80	1.61	.80	1.30	1.30	1.18	1.37
10	107	.99	1.22	1.16	1.14	1.37	1.14	1.89	1.93	1.28	.64	1.47	1.26	.96	1.64
11	112	.46	.89	1.11	1.33	1.17	.79	1.54	1.92	1.11	.67	1.42	1.02	1.33	1.48
12	113	.92	1.34	1.15	1.28	1.30	1.15	1.92	1.89	.83	.69	1.46	1.13	1.40	1.93
13	114	.48	1.11	.82	1.37	1.51	.66	1.49	1.66	1.37	.77	1.64	1.73	1.04	1.37
14	116	2.10	1.83	2.64	2.89	2.63	1.80	1.53	2.22	3.10	2.21	2.58	2.49	2.84	1.98
15	118	.80	1.22	.96	1.01	1.50	1.04	1.64	1.75	1.28	.42	1.35	1.45	.92	1.52
16	125	.35	.75	.95	1.18	1.29	.43	1.47	1.30	1.24	.37	1.69	1.19	1.20	1.39
17	128	.75	.86	1.54	1.24	1.20	.95	1.13	1.40	1.35	.86	2.00	1.23	1.56	1.01
18	192	.95	1.54	.84	1.09	1.63	1.07	2.10	1.74	1.14	.77	1.39	1.73	.97	1.86
19	310	1.18	1.24	1.09	.93	1.38	1.21	2.40	1.65	1.30	1.04	1.86	1.37	.96	1.92
20	320	1.29	1.20	1.63	1.38	1.28	1.27	2.33	2.53	1.19	1.27	2.36	1.37	1.52	2.07
21	330	.43	.95	1.07	1.21	1.27	.70	1.73	1.67	1.41	.77	1.72	1.57	1.04	1.56
22	340	1.47	1.13	2.10	2.40	2.33	1.73	1.98	1.96	2.33	1.61	1.71	2.25	2.33	1.39
23	31039	1.30	1.80	1.74	1.65	2.53	1.67	1.96	1.48	2.20	1.58	1.36	2.25	1.91	1.61
24	10068	1.24	1.35	1.14	1.30	1.19	1.41	2.33	2.20	1.18	.94	2.01	1.33	1.41	1.99
25	20073	.37	.96	.77	1.04	1.27	.77	1.61	1.58	.94	.03	1.42	1.34	1.08	1.33
26	30121	1.69	2.00	1.39	1.94	2.36	1.72	1.71	1.36	2.01	1.42	1.34	1.86	1.63	1.83
27	30122	1.19	1.23	1.73	1.37	1.37	1.57	2.25	2.25	1.33	1.34	1.86	1.27	1.77	1.96
28	30130	1.20	1.56	.97	.96	1.52	1.04	2.33	1.91	1.41	1.08	1.63	1.77	1.00	2.05
29	30188	1.39	1.01	1.86	1.92	2.07	1.56	1.39	1.61	1.99	1.33	1.83	1.96	2.05	1.30
30	30280	.98	1.14	1.07	1.56	1.06	1.25	1.23	2.50	1.01	.86	.50	1.59	1.60	1.89
31	30800	1.12	1.69	1.57	1.27	2.11	1.81	1.95	1.54	1.87	1.23	1.55	1.55	1.75	1.56

Table 2A. Latitude Residuals Meters. Point Positions/Orbit Fixed

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-45.87	166.67	-174.10	4736	-97.73	144.63	-170.72	141.13	-77.31	-77.31	138.65	-106.73	-149.83	-1.38	-68.76
LATITUDE	-23.22	-77.85	52.73	50.80	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.18	78.54
1	8	.64	.98	.88	.99	.86	.97	.75	3.64	.78	.87	.92	.93	.95	.85
2	19	.98	1.24	1.06	1.51	1.38	1.56	1.22	1.26	4.17	1.39	1.40	1.46	1.43	1.59
3	127	.88	1.66	.75	.91	.95	1.67	1.11	.97	3.61	1.04	1.19	.93	.87	1.11
4	21	.99	1.51	.91	.73	1.08	1.18	1.13	.93	2.83	1.20	1.01	.88	.78	.98
5	31061	.86	1.38	.95	1.08	.64	1.40	.64	.83	3.44	.81	.70	.38	.74	.83
6	23	.97	1.56	1.67	1.18	1.40	.94	1.42	1.22	3.22	1.18	.63	1.17	.89	1.38
7	24	.77	1.22	1.11	1.13	.64	1.42	.90	1.16	3.85	1.26	1.10	.88	.94	1.28
8	27	.75	1.26	.97	.93	.83	1.22	1.16	.54	3.72	1.07	.81	.69	.94	1.33
9	30682	3.64	4.17	3.61	2.83	3.44	3.22	3.85	3.72	3.44	3.35	3.30	3.43	3.54	2.71
10	107	.78	1.39	1.04	1.20	.81	1.18	1.26	1.07	3.35	.81	1.07	1.00	.93	1.11
11	112	.87	1.40	1.19	1.01	.70	.63	1.10	.81	3.30	1.07	.63	.72	.71	1.14
12	113	.92	1.46	.93	.88	.38	1.17	.88	.69	3.43	1.00	.72	.45	.60	1.38
13	114	.93	1.43	.87	.78	.74	.89	.94	.69	3.54	.93	.71	.60	.44	1.21
14	116	.95	1.59	1.11	.98	.74	1.38	1.28	1.33	2.71	1.11	1.14	1.38	1.21	1.12
15	118	.85	1.28	1.05	.92	.83	1.42	1.17	.82	3.52	1.05	1.14	.93	1.10	1.08
16	125	.99	1.31	1.23	1.08	.93	.83	1.32	.88	3.48	1.16	.57	.84	.76	1.44
17	128	1.28	1.22	1.17	1.33	1.26	1.35	1.27	1.27	4.79	1.47	1.28	1.21	1.03	1.76
18	192	.76	1.32	.88	1.07	.72	1.14	1.18	.58	3.45	.94	.88	.88	.85	.96
19	310	.50	1.06	.84	.79	.56	.99	.85	.53	3.36	.72	.69	.63	.66	.88
20	320	1.17	1.57	1.44	1.67	1.61	2.16	1.23	1.57	3.70	1.69	1.81	1.78	1.88	1.40
21	330	.78	1.26	1.10	1.00	.72	.78	1.12	.63	3.51	.97	.35	.67	.77	1.24
22	340	.74	1.31	.73	.80	.66	.95	1.18	.95	3.38	.79	.90	.94	.69	.70
23	31039	.46	.94	1.34	1.08	1.35	.88	1.36	1.11	3.71	.94	1.01	1.24	.99	1.36
24	10068	.98	1.70	1.08	.74	1.33	1.23	1.53	1.13	2.42	1.25	1.08	1.29	1.16	.75
25	20073	.95	1.46	1.54	1.42	1.25	1.18	1.44	1.37	3.62	1.13	1.23	1.49	1.27	1.30
26	30121	.52	1.37	.95	1.01	.88	.98	.88	.58	3.33	.92	.58	.88	.67	1.03
27	30122	.67	1.25	.86	.68	.46	1.05	.80	.89	.62	.79	.68	.50	.44	.82
28	30130	.72	1.37	.86	.80	.70	.88	1.13	.68	3.28	.87	.54	.63	.60	1.07
29	30188	.97	1.56	1.09	.75	.69	.96	.98	1.13	2.76	1.06	.86	.81	.74	.78
30	30280	.81	1.35	1.24	.77	.72	.25	1.07	.93	3.42	1.07	.37	.73	.85	1.88
31	30800	.94	1.51	1.04	1.05	.96	1.13	1.07	1.00	3.37	1.23	.99	.93	.83	1.23
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30280
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-158.00	-70.85
LATITUDE	50.87	49.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-35.62
1	8	.99	1.28	.76	.90	1.17	.78	.74	.46	.98	.95	.52	.67	.72	.97
2	19	1.31	1.22	1.32	1.06	1.57	1.26	1.31	.94	1.70	1.46	1.37	1.25	1.37	1.56
3	127	1.23	1.17	.88	.84	1.44	1.10	.73	1.34	1.08	1.54	.95	.86	.86	1.09
4	21	1.08	1.33	1.07	.79	1.67	1.00	.80	1.08	.74	1.42	1.01	.68	.80	.75
5	31061	.93	1.26	.72	.56	1.61	.72	.66	1.35	1.33	1.25	.88	.46	.70	.69
6	23	.83	1.35	1.14	.99	2.16	.78	.95	.88	1.23	1.18	.98	1.05	.88	.96
7	24	1.32	1.27	1.18	.85	1.23	1.12	1.18	1.36	1.53	1.44	.88	.80	1.13	.98
8	27	.88	1.27	.58	.53	1.57	.63	.95	1.11	1.13	1.37	.58	.89	.68	1.13
9	30682	3.48	4.79	3.43	3.36	3.70	3.51	3.38	3.71	2.42	3.62	3.33	.62	3.28	2.76
10	107	1.16	1.47	.94	.72	1.69	.97	.79	.94	1.25	1.13	.92	.79	.87	1.06
11	112	.57	1.28	.88	.69	1.81	.35	.90	1.01	1.08	1.23	.58	.68	.54	.86
12	113	.84	1.21	.88	.63	1.78	.67	.94	1.24	1.29	1.49	.88	.50	.63	.81
13	114	.76	1.03	.85	.66	1.88	.69	.77	.95	1.16	1.27	.67	.44	.60	.74
14	116	1.44	1.76	.96	.88	1.40	1.24	.70	1.36	.75	1.30	1.03	.82	1.07	.78
15	118	1.33	1.13	.68	.67	1.73	.98	.97	1.15	1.23	1.01	.80	.72	.95	.88
16	125	.70	1.13	1.02	.91	1.82	.41	.94	1.02	1.19	1.15	.67	.68	.47	1.16
17	128	1.13	1.01	1.12	1.16	2.03	1.04	1.17	.89	1.63	1.24	1.33	1.07	1.07	1.30
18	192	1.02	1.12	.58	.51	1.69	.79	.84	1.06	1.08	1.37	.60	.82	.73	.87
19	310	.91	1.16	.51	.35	1.48	.61	.80	.83	.95	1.20	.58	.44	.58	.71
20	320	1.82	2.03	1.69	1.48	1.60	1.73	1.83	1.70	1.57	1.73	1.70	1.64	1.61	1.93
21	330	.41	1.04	.73	.81	1.73	.49	.79	.90	1.09	1.12	.60	.63	.35	.93
22	340	.94	1.17	.64	.60	1.63	.79	.64	.62	.74	1.22	.88	.60	.59	.88
23	31039	1.02	.89	1.06	.83	1.70	.90	.62	.88	1.11	.79	1.01	1.02	.91	1.18
24	10068	1.19	1.63	1.08	.95	1.57	1.09	.74	1.11	1.01	1.42	1.07	.84	.90	1.07
25	20073	1.15	1.24	1.37	1.20	1.73	1.12	1.22	.79	1.42	1.17	.92	1.23	1.11	1.34
26	30121	.67	1.33	.60	.58	1.70	.60	.88	1.01	1.07	.92	.54	.68	.54	.81
27	30122	.68	1.07	.82	.44	1.64	.63	.80	1.12	.84	1.23	.68	.39	.52	.48
28	30130	.47	1.07	.73	.38	1.61	.35	.59	.91	.90	1.11	.54	.52	.38	.87
29	30188	1.16	1.30	.87	.71	1.93	.93	.80	1.18	1.07	1.34	.81	.48	.87	.72
30	30280	.92	1.37	.97	.85	1.80	.55	.89	.74	1.00	.99	.68	.69	.68	.71
31	30800	1.17	1.06	.84	.85	1.91	.95	1.08	1.17	1.32	1.07	.46	.79	.94	.72

Table 2B. Latitude Residuals Meters. Point Positions/Orbit Relaxed

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-45.87	144.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	138.65	-106.75	-149.83	-1.38	-68.76
LATITUDE	-23.22	-77.45	52.73	50.60	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.18	76.34
1	8	.61	1.29	.75	.75	.69	.61	1.30	.98	2.62	.75	.67	.73	.74	1.08
2	19	1.29	1.44	1.45	1.54	2.13	1.60	2.43	1.33	3.43	1.66	1.72	1.43	1.59	1.97
3	127	.76	1.45	.72	.86	1.06	1.23	1.46	.92	2.79	.78	1.11	.91	.78	1.10
4	21	.75	1.54	.86	.68	1.09	.89	1.41	.85	1.98	.84	.99	.83	.81	1.14
5	31061	.69	2.13	1.06	1.09	.51	1.02	1.24	.81	2.40	.56	.49	.48	.58	.75
6	23	.61	1.60	1.23	.89	1.02	.64	1.33	.90	2.38	.98	.57	.94	.77	1.44
7	24	1.30	2.43	1.46	1.41	1.24	1.33	1.24	1.57	2.68	1.62	1.11	1.21	1.14	2.09
8	27	.58	1.33	.92	.85	.81	.90	1.57	.53	2.78	.85	.70	.52	.88	1.29
9	30682	2.62	3.43	2.79	1.98	2.40	2.38	2.68	2.78	2.45	2.23	2.49	2.49	2.59	2.02
10	107	.75	1.66	.75	.84	.56	.98	1.62	.85	2.23	.55	.84	.76	.64	1.06
11	112	.67	1.72	1.11	.99	.49	.57	1.11	.70	2.49	.84	.50	.54	.70	1.48
12	113	.73	1.43	.91	.83	.48	.94	1.21	.52	2.49	.76	.54	.41	.68	1.55
13	114	.74	1.59	.78	.81	.56	.77	1.14	.88	2.59	.64	.70	.68	.43	1.33
14	116	1.08	1.97	1.10	1.14	.75	1.44	2.09	1.29	2.02	1.06	1.48	1.55	1.33	1.19
15	118	.75	1.82	1.17	.96	.63	1.08	1.78	.95	2.43	1.03	1.01	1.01	1.05	1.04
16	125	1.00	1.23	1.08	1.07	.88	.80	1.43	.83	2.81	.88	.84	.89	.72	1.40
17	128	1.27	1.42	1.15	1.36	1.31	1.22	1.76	1.24	3.27	1.30	1.32	1.12	.89	1.76
18	192	.72	1.65	1.11	1.01	.57	.73	1.38	.68	2.42	.91	.70	.86	.74	1.14
19	310	.35	1.53	.98	.79	.49	.55	1.25	.63	2.34	.65	.45	.63	.66	1.16
20	320	1.64	2.19	1.57	1.77	1.90	2.08	1.75	1.84	3.08	1.89	1.94	1.82	2.02	1.35
21	330	.76	1.51	.98	.97	.57	.67	1.43	.59	2.40	.71	.50	.68	.70	1.21
22	340	.78	1.37	.86	.77	.61	.94	1.67	.90	2.14	.60	.94	.94	.89	.64
23	31039	.68	1.11	1.29	1.10	1.20	.80	1.43	1.05	2.82	1.03	1.03	1.20	1.10	1.32
24	10068	.70	1.49	.82	.48	.70	.40	1.47	.88	2.09	.46	.84	.76	.67	.93
25	20073	1.01	1.48	1.33	1.01	1.05	1.05	1.70	1.29	2.57	1.28	1.23	1.15	1.16	1.62
26	30121	.50	1.69	.79	.91	.87	.77	1.22	.59	2.53	.83	.71	.85	.88	1.17
27	30122	.38	1.58	.90	.64	.67	.74	1.26	.53	2.12	.76	.58	.57	.70	1.05
28	30130	.60	1.53	.87	.66	.53	.65	1.45	.68	2.10	.42	.60	.60	.59	1.02
29	30188	.63	1.87	1.02	.66	.59	.63	1.24	1.01	1.91	.51	.69	.82	.63	1.11
30	30280	.67	1.75	1.35	.95	.60	.58	.76	.97	2.64	1.04	.51	.67	1.03	1.66
31	30800	.81	1.80	1.17	1.24	1.10	.88	1.30	1.06	2.73	1.38	.94	1.29	1.03	1.93
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30280
LONGITUDE	-114.29	-75.92	-97.73	-68.61	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-78.42	-57.61	13.73	-158.00	-70.85
LATITUDE	50.97	45.40	30.39	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	1.00	1.27	.72	.35	1.64	.76	.78	.68	.70	1.01	.50	.38	.60	.63
2	19	1.23	1.42	1.65	1.53	2.19	1.51	1.37	1.11	1.49	1.48	1.69	1.58	1.53	1.87
3	127	1.08	1.15	1.11	.98	1.57	.98	.86	1.29	.82	1.33	.79	.80	.87	1.02
4	21	1.07	1.36	1.01	.79	1.77	.97	.77	1.10	.49	1.01	.91	.64	.66	.66
5	31061	.88	1.31	.57	.49	1.90	.57	.61	1.20	.70	1.05	.87	.67	.53	.59
6	23	.50	1.22	.73	.55	2.08	.67	.94	.80	.80	1.05	.77	.74	.65	.63
7	24	1.43	1.76	1.38	1.25	1.75	1.45	1.67	1.83	1.47	1.70	1.22	1.26	1.45	1.24
8	27	.83	1.24	.68	.63	1.84	.59	.90	1.05	.88	1.29	.59	.53	.68	1.01
9	30682	2.81	3.27	2.42	2.34	3.08	2.40	2.14	2.82	2.08	2.57	2.53	2.12	2.10	1.91
10	107	.98	1.30	.91	.65	1.89	.71	.60	1.03	.46	1.28	.83	.76	.42	.51
11	112	.94	1.32	.70	.45	1.94	.50	.94	1.03	.84	1.23	.71	.58	.60	.69
12	113	.89	1.12	.86	.63	1.82	.68	.94	1.20	.76	1.15	.85	.57	.60	.82
13	114	.72	.89	.74	.66	2.02	.70	.89	1.10	.67	1.18	.68	.70	.59	.63
14	116	1.40	1.76	1.14	1.16	1.35	1.21	.64	1.32	.93	1.62	1.17	1.05	1.02	1.11
15	118	1.35	1.28	.84	.86	2.12	1.06	1.19	1.39	1.03	1.33	.96	.80	.85	.90
16	125	.72	1.07	.91	.86	2.13	.45	.77	.87	.82	1.12	.66	.69	.66	1.04
17	128	1.07	1.05	1.17	1.26	2.54	1.20	1.41	1.42	1.31	1.43	1.33	1.34	1.21	1.40
18	192	.91	1.17	.65	.65	2.12	.71	1.04	1.24	.97	1.60	.80	.61	.68	.77
19	310	.84	1.26	.65	.40	1.75	.63	.73	.86	.65	1.02	.63	.49	.51	.50
20	320	2.13	2.54	2.12	1.75	1.81	1.96	1.60	1.95	1.75	2.00	1.72	1.72	1.89	1.92
21	330	.45	1.20	.71	.63	1.96	.40	.72	.93	.74	1.21	.56	.48	.42	.81
22	340	.77	1.41	1.04	.73	1.60	.72	.71	.75	.41	1.13	.82	.67	.55	.79
23	31039	.67	1.42	1.24	.66	1.95	.93	.75	.93	.84	.97	.99	.92	1.13	.77
24	10068	.82	1.31	.97	.65	1.75	.74	.61	.84	.94	1.01	.78	.64	.41	.55
25	20073	1.12	1.43	1.60	1.02	2.00	1.21	1.13	.97	1.01	1.01	.85	1.22	1.17	1.25
26	30121	.66	1.33	.80	.63	1.72	.56	.82	.99	.78	.85	.53	.52	.60	.61
27	30122	.69	1.34	.61	.49	1.72	.48	.67	1.09	.64	1.22	.52	.38	.43	.54
28	30130	.66	1.21	.68	.51	1.89	.42	.55	.92	.41	1.17	.68	.43	.35	.50
29	30188	1.04	1.40	.77	.50	1.92	.81	.79	1.13	.55	1.23	.81	.54	.50	.57
30	30280	1.22	1.74	1.05	.49	1.60	.49	1.07	.77	.93	1.13	.76	.74	.86	.71
31	30800	1.38	1.19	.92	.86	2.12	1.15	1.41	1.36	1.29	1.16	.85	.82	1.12	.84

Table 2C. Latitude Residuals Meters. Semi Short Ar/Max Gap = 30 Deg.

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	1	19	137	21	31061	23	24	27	30602	107	112	113	114	116	118
LONGITUDE	-45.07	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	130.65	-106.75	-149.03	-1.30	-60.76
LATITUDE	-23.22	-77.05	52.73	50.00	30.30	13.44	-14.33	39.14	39.00	39.00	-34.67	32.20	61.20	51.10	76.54
1	8	.41	1.47	1.39	.92	.52	.68	1.10	.51	4.74	.64	.39	.60	.61	2.10
2	19	1.47	1.44	1.77	1.62	1.60	1.77	2.40	1.62	5.27	1.89	1.76	1.50	1.75	2.50
3	127	1.39	1.77	1.34	1.40	.66	1.31	1.62	1.00	4.32	1.50	1.66	1.51	.64	1.69
4	21	.92	1.62	1.40	.69	.02	.74	1.22	.04	3.72	.90	.99	.07	.91	.03
5	31061	.52	1.60	.66	.02	.40	.46	1.25	.46	4.21	1.14	.00	.50	.55	.67
6	23	.67	1.77	1.31	.74	.06	.66	1.36	.00	3.00	.77	.74	.01	.77	2.04
7	24	1.10	2.40	1.62	1.22	1.25	1.36	1.27	1.50	3.64	1.24	1.15	1.45	1.35	2.79
8	27	.51	1.62	1.00	.04	.46	.00	1.50	.30	4.42	.70	.59	.42	.67	2.02
9	30602	4.74	5.27	4.32	3.72	4.21	3.00	3.64	4.42	4.14	3.66	4.10	4.29	1.05	3.40
10	107	.64	1.89	1.50	.90	1.14	.77	1.24	.70	3.66	.69	.64	.96	.00	2.10
11	112	.39	1.76	1.66	.99	.00	.74	1.15	.59	4.10	.64	.52	.55	.00	2.31
12	113	.60	1.50	1.51	.07	.50	.01	1.45	.42	4.29	.96	.55	.46	.75	2.24
13	114	.61	1.75	.04	.91	.55	.77	1.35	.67	1.05	.00	.00	.75	.00	2.02
14	116	2.10	2.50	1.69	.03	.67	2.04	2.79	2.02	3.40	2.10	2.31	2.24	2.02	2.01
15	118	.03	1.59	1.59	1.02	.77	.94	1.92	.50	4.79	1.10	.95	.65	.95	1.02
16	125	.92	2.09	1.40	1.27	1.16	1.16	1.01	.97	5.07	1.31	1.03	.90	.00	2.59
17	128	1.10	2.61	1.77	1.07	1.60	1.50	1.70	1.55	4.16	1.70	1.59	1.56	1.33	2.60
18	192	.05	1.49	1.31	.09	.79	.91	1.40	.70	4.05	.74	.94	.00	.00	2.25
19	310	.60	1.70	1.55	.70	.06	.61	.93	.75	3.50	.46	.56	.02	.73	2.17
20	320	1.07	2.40	2.29	2.22	1.03	2.22	1.77	2.15	4.07	2.13	2.02	2.13	2.26	2.11
21	330	.55	1.23	1.25	.00	.40	.74	1.51	.41	4.27	.93	.75	.59	.56	1.90
22	340	.07	1.77	1.03	1.05	.67	1.02	1.44	.02	3.69	1.05	1.01	.99	.00	1.45
23	31039	.40	1.41	1.73	.97	1.22	.69	1.79	.99	.50	.93	.92	.90	1.13	1.95
24	10060	.01	1.40	1.59	.61	1.02	.79	1.59	.72	4.12	.00	.04	.02	.71	2.09
25	20073	1.44	1.62	2.33	1.13	1.12	1.06	1.97	1.44	4.60	1.70	1.42	1.34	1.56	2.64
26	30121	.51	1.56	1.00	.65	.42	.71	1.10	.59	4.14	.03	.61	.67	.62	2.22
27	30122	.39	1.70	1.49	1.10	.57	.00	1.27	.65	4.15	.97	.55	.62	.93	2.00
28	30130	.69	1.46	1.44	.74	.56	.02	1.22	.56	3.69	.04	.71	.69	.66	2.10
29	30100	.57	1.65	1.41	.69	.72	.52	1.22	.75	3.71	.67	.69	.03	.74	1.00
30	30200	.57	1.09	1.07	.99	.90	.73	.73	.93	5.00	.75	.66	.91	1.03	2.00
31	30000	.03	1.02	1.61	1.20	.06	.77	1.34	1.01	4.32	.93	.94	1.00	.07	2.36
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	126	192	311	320	330	340	31039	10060	20073	30121	30122	30130	30100	30200
LONGITUDE	-114.29	-75.92	-97.73	-60.01	-93.00	-119.07	-150.00	-105.12	-14.40	144.61	-70.42	-57.61	33.73	-50.00	-70.05
LATITUDE	50.07	45.40	30.30	44.40	44.73	34.11	21.52	64.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	.92	1.10	.05	.60	1.07	.55	.07	.40	.01	1.44	.51	.39	.69	.57
2	19	1.09	2.61	1.49	1.70	2.40	1.23	1.77	1.41	1.40	1.62	1.56	1.70	1.46	1.65
3	127	1.40	1.77	1.31	1.55	2.29	1.25	1.03	1.73	1.59	2.33	1.00	1.49	1.44	1.41
4	21	1.27	1.07	.09	.70	2.22	.00	1.05	.97	.61	1.13	.65	1.10	.74	.69
5	31061	1.16	1.60	.79	.06	1.03	.40	.67	1.22	1.02	1.12	.42	.57	.56	.72
6	23	1.16	1.50	.91	.61	2.22	.74	1.02	.69	.79	1.06	.71	.00	.02	.52
7	24	1.01	1.70	1.40	.93	1.77	1.51	1.44	1.79	1.59	1.97	1.10	1.27	1.22	1.22
8	27	.97	1.55	.70	.75	2.15	.41	.02	.99	.72	1.44	.59	.65	.56	.75
9	30602	5.07	4.16	4.05	3.50	4.07	4.27	3.69	.50	4.12	4.60	4.14	4.15	3.69	3.71
10	107	1.31	1.70	.74	.46	2.13	.93	1.05	.93	.00	1.70	.03	.97	.04	.67
11	112	1.03	1.59	.94	.56	2.02	.75	1.01	.92	.04	1.42	.61	.55	.71	.69
12	113	.90	1.56	.00	.02	2.13	.59	.99	.90	.02	1.34	.67	.62	.69	.03
13	114	.00	1.33	.00	.73	2.26	.56	.60	1.13	.71	1.56	.62	.93	.66	.74
14	116	2.59	2.60	2.25	2.17	2.11	1.90	1.45	1.95	2.09	2.64	2.22	2.00	2.10	1.00
15	118	1.19	1.74	1.12	1.15	2.04	.57	1.06	1.07	1.01	1.50	1.09	.04	.97	1.01
16	125	.07	1.02	1.02	1.23	2.40	.01	1.32	.77	1.01	1.30	1.00	1.10	1.09	1.16
17	128	1.02	1.55	1.62	1.62	2.92	1.50	1.59	2.12	1.77	2.19	1.03	1.63	1.60	1.69
18	192	1.02	1.62	.73	.02	2.34	.77	1.29	1.13	1.00	1.69	.73	1.10	.05	1.02
19	310	1.23	1.62	.02	.57	1.90	.02	.94	.09	.71	1.37	.60	.70	.55	.67
20	320	2.40	2.92	2.34	1.90	2.02	1.97	1.05	2.20	2.34	2.53	2.02	1.76	1.97	1.93
21	330	.01	1.50	.77	.02	1.97	.44	.07	.05	.69	1.21	.70	.72	.57	.74
22	340	1.32	1.59	1.29	.94	1.05	.07	.03	1.11	.90	1.60	1.15	.02	.00	.69
23	31039	.77	2.12	1.13	.09	2.20	.05	1.11	.06	.76	1.31	1.04	1.09	.99	.60
24	10060	1.01	1.77	1.00	.71	2.34	.69	.90	.76	.56	1.11	.02	1.09	.99	.60
25	20073	1.30	2.19	1.69	1.37	2.53	1.21	1.60	1.31	1.11	1.26	1.04	1.46	1.15	1.23
26	30121	1.00	1.03	.73	.60	2.02	.70	1.15	1.04	.02	1.04	.40	.76	.52	.69
27	30122	1.10	1.63	1.10	.70	1.76	.72	.02	1.09	1.09	1.46	.76	.66	.77	.74
28	30130	1.09	1.60	.05	.55	1.97	.57	.00	.99	.59	1.15	.52	.77	.69	.67
29	30100	1.10	1.69	1.02	.47	1.93	.74	.69	.60	.60	1.23	.69	.74	.67	.54
30	30200	1.42	1.42	1.35	.63	1.70	.93	.96	.60	1.01	1.29	.06	.54	.90	.54
31	30000	1.25	1.50	.00	.94	2.22	.91	1.44	1.17	1.25	1.32	.79	.77	1.12	1.03

Table 2D. Latitude Residuals Meters. Semi Short Arc/Max Gap = 90 Deg.

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	1	19	127	21	31061	23	24	27	30662	107	112	113	114	116	118
LONGITUDE	-45.07	166.67	174.18	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	136.65	-106.75	-149.83	-1.38	-46.76
LATITUDE	-23.22	-77.05	52.73	50.00	30.30	13.44	-14.33	39.14	39.00	39.00	-34.67	32.20	61.20	51.10	76.54
1	8	.43	1.17	.70	.03	.52	.91	1.07	.54	.55	.90	.02	.96	.50	1.01
2	19	1.17	1.20	1.33	1.53	.92	1.00	1.50	1.26	4.01	1.70	1.63	1.62	1.58	1.75
3	127	.70	1.33	.75	1.20	.52	1.46	1.24	4.05	1.21	1.29	1.41	.79	1.11	1.20
4	21	.03	1.53	1.20	.67	.96	.09	.96	.77	3.52	1.21	.92	1.00	.67	1.55
5	31061	.52	.92	.52	.96	.61	1.51	.82	.77	4.27	1.36	.93	1.05	.74	.95
6	23	.91	1.00	1.46	.09	1.51	.05	1.20	.00	3.30	1.07	.04	.96	.76	1.40
7	24	1.07	1.50	1.24	.98	.82	1.20	.99	1.13	4.05	1.46	.99	1.07	1.03	1.02
8	27	.54	1.26	.04	.77	.77	.00	1.13	.46	3.94	.99	.76	.92	.57	1.17
9	30662	.55	4.01	4.05	3.52	4.27	3.30	4.05	3.94	3.04	3.74	3.76	4.06	3.71	3.10
10	107	.90	1.70	1.21	1.21	1.36	1.07	1.46	.99	3.74	.01	.09	1.16	.79	1.29
11	112	.02	1.63	1.29	.92	.93	.04	.99	.76	3.76	.09	.66	.53	.71	1.44
12	113	.96	1.62	1.41	1.00	1.05	.96	1.07	.92	4.06	1.16	.53	.00	.02	1.70
13	114	.59	1.50	.79	.07	.74	.76	1.03	.57	3.71	.79	.71	.02	.39	1.06
14	116	.70	1.75	1.11	1.55	.95	1.40	1.02	1.17	3.10	1.29	1.44	1.70	1.06	1.19
15	118	1.01	1.73	1.20	1.20	.79	1.20	.97	1.07	4.46	1.46	.92	.93	1.03	1.42
16	125	.90	.92	1.30	1.22	1.10	1.31	1.37	1.01	4.91	1.34	1.16	1.01	1.04	2.02
17	120	1.30	1.97	1.53	1.46	1.24	.90	1.45	1.25	4.74	1.87	1.14	1.30	.96	1.71
18	192	1.04	1.35	.09	1.16	.79	1.11	1.23	.79	6.10	1.15	.93	1.10	.00	1.43
19	310	.69	1.42	1.06	.09	1.01	.61	.90	.55	3.57	.64	.62	.90	.66	1.11
20	320	2.07	1.47	1.07	2.36	1.94	2.70	2.00	2.27	5.19	2.37	2.46	2.54	2.29	2.15
21	330	.61	1.00	.03	.99	.62	.98	.07	.55	4.17	1.15	.04	.77	.66	1.36
22	340	.42	1.42	.93	.00	1.06	.65	1.14	.39	3.64	.00	.79	.91	.50	1.00
23	31039	.61	.06	1.32	1.12	1.19	1.14	1.24	1.03	4.57	1.20	1.20	1.17	1.10	1.71
24	10060	.75	1.43	1.07	.56	1.00	.76	1.19	.75	3.56	1.10	.95	.97	.76	1.45
25	20073	1.35	1.73	1.51	1.00	1.22	1.24	1.55	1.36	4.03	1.50	1.49	1.31	1.06	1.92
26	30121	.00	1.40	1.10	.95	1.04	.93	1.19	.59	3.81	.59	.77	1.17	.63	1.26
27	30122	.55	1.21	.94	.66	.72	.91	.94	.87	.72	.06	.60	.07	.42	1.09
28	30130	.68	1.36	.04	.66	.94	1.00	1.28	.48	3.55	.95	.85	.94	.67	1.23
29	30100	.61	1.62	1.14	.71	1.06	.56	.08	.67	3.31	.04	.61	.77	.50	1.17
30	30200	.06	1.73	1.57	.95	1.67	.72	1.20	.97	4.11	.01	.00	.70	1.50	1.26
31	30000	.97	1.52	.95	1.10	.79	1.36	1.06	1.12	4.19	1.32	1.34	1.60	.97	1.42
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	126	192	310	320	330	340	31039	10060	20073	30121	30122	30130	30100	30200
LONGITUDE	-114.25	-75.92	-97.73	-68.01	-93.00	-119.07	-150.00	-185.12	-14.40	144.61	-78.42	-57.61	33.73	-150.00	-70.05
LATITUDE	50.07	45.40	30.30	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	.90	1.30	1.04	.69	2.07	.61	.42	.61	.75	1.35	.60	.55	.60	.61
2	19	.92	1.97	1.35	1.42	1.47	1.00	1.42	.06	1.43	1.73	1.40	1.21	1.36	1.62
3	127	1.30	1.53	.09	1.06	1.07	.03	.93	1.32	1.07	1.51	1.10	.94	.04	1.14
4	21	1.27	1.46	1.16	.09	2.36	.99	.00	1.12	.56	1.00	.95	.66	.66	.71
5	31061	1.10	1.24	.79	1.01	1.94	.62	1.06	1.19	1.00	1.22	1.04	.72	.94	1.06
6	23	1.31	.90	1.11	.61	2.70	.98	.65	1.14	.76	1.24	.93	.91	1.00	.56
7	24	1.37	1.45	1.23	.90	2.00	.07	1.14	1.24	1.19	1.55	1.19	.94	1.20	.00
8	27	1.01	1.25	.79	.55	2.27	.55	.39	1.03	.75	1.36	.59	.37	.40	.67
9	30662	4.91	4.74	4.10	3.57	5.19	4.17	3.64	4.57	3.56	4.03	3.81	.72	3.55	3.31
10	107	1.34	1.37	1.15	.64	2.37	1.15	.08	1.20	1.10	1.50	.59	.06	.95	.04
11	112	1.16	1.14	.93	.62	2.46	.04	.79	1.20	.95	1.49	.77	.68	.05	.61
12	113	1.01	1.30	1.30	.90	2.54	.77	.91	1.17	.97	1.31	1.17	.07	.94	.77
13	114	1.04	.96	.00	.46	2.29	.66	.50	1.10	.76	1.06	.63	.42	.67	.50
14	116	2.02	1.71	1.43	1.11	2.15	1.36	1.00	1.71	1.45	1.92	1.26	1.09	1.23	1.17
15	118	1.26	1.60	1.03	1.17	2.30	.74	1.10	1.22	1.15	1.59	1.22	1.05	1.04	.95
16	125	.90	1.27	.95	1.12	2.50	.75	1.20	.76	1.09	1.10	1.21	.59	1.10	1.23
17	120	1.27	1.23	1.20	1.07	3.00	1.34	1.36	1.31	1.43	1.31	1.12	1.25	1.51	1.26
18	192	.95	1.20	.70	.00	2.43	.00	1.03	1.00	1.12	1.46	.06	.74	.00	1.01
19	310	1.12	1.07	.00	.56	2.25	.00	.52	.90	.91	1.30	.49	.45	.00	.59
20	320	2.50	3.00	2.43	2.25	2.10	2.07	2.29	2.23	2.51	2.97	2.42	1.99	2.33	2.31
21	330	.75	1.34	.00	.00	2.07	.55	.71	.70	.02	1.22	.95	.74	.01	.75
22	340	1.20	1.36	1.03	.52	2.29	.71	.52	.00	.69	1.30	.67	.40	.60	.43
23	31039	.76	1.31	1.00	.90	2.23	.70	.00	.92	1.00	1.44	1.10	1.05	1.13	1.10
24	10060	1.09	1.43	1.12	.91	2.51	.02	.69	1.00	.57	.77	.93	.62	.54	.67
25	20073	1.10	1.31	1.46	1.30	2.97	1.22	1.30	1.44	.77	1.06	1.09	.99	1.17	1.10
26	30121	1.21	1.12	.06	.49	2.42	.95	.67	1.10	.93	1.09	.57	.63	.06	.70
27	30122	.59	1.25	.74	.45	1.99	.74	.40	1.05	.62	.99	.63	.24	.44	.39
28	30130	1.10	1.51	.00	.00	2.33	.01	.60	1.13	.54	1.17	.06	.44	.41	.69
29	30100	1.23	1.26	1.01	.46	2.33	.75	.43	1.10	.67	1.10	.70	.39	.69	.52
30	30200	1.39	1.36	1.51	.59	2.51	.93	.69	.90	1.05	1.50	.03	.61	1.07	.57
31	30000	1.2	1.52	.00	1.09	2.04	.97	1.10	1.16	1.12	1.32	.00	.94	1.11	1.07

Table 2E. Latitude Residuals Meters. Semi Short Arc/90 Deg. 6 Par

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	1	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-45.67	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	130.65	-106.75	-49.03	-1.30	-68.76
LATITUDE	-23.22	-77.95	52.73	50.00	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.20	61.20	51.10	76.54
1	8	.59	1.71	1.30	.01	.77	1.15	1.13	.04	3.97	1.20	1.07	1.10	.76	1.33
2	19	1.71	1.57	1.61	1.55	1.65	1.67	2.01	1.45	4.68	2.19	1.72	2.02	1.70	1.91
3	127	1.30	1.61	1.26	1.40	.70	1.92	.00	.00	4.31	2.03	1.59	1.99	.93	1.09
4	21	.01	1.95	1.40	.62	.74	.98	1.62	.62	3.70	1.42	.99	1.06	.91	1.07
5	31061	.77	1.65	.70	.74	.54	1.36	.91	.50	4.30	1.41	1.02	.97	.75	.74
6	23	1.15	1.67	1.92	.98	1.36	1.09	2.24	1.26	4.16	1.37	.71	1.30	1.27	2.51
7	24	1.13	2.01	.40	1.62	.91	2.24	1.36	1.44	4.35	1.67	1.92	1.05	1.34	.02
8	27	.04	1.45	.08	.62	.50	1.26	1.44	.40	4.63	1.31	.09	.96	.00	1.59
9	30682	3.97	4.68	4.31	3.78	4.30	4.16	4.35	4.63	4.06	3.78	4.33	4.16	3.86	3.59
10	107	1.20	2.19	2.03	1.42	1.41	1.37	1.67	1.31	3.70	1.06	1.39	1.11	.93	1.70
11	112	1.07	1.72	1.59	.99	1.02	.71	1.92	.09	4.33	1.39	.92	.95	1.11	2.15
12	113	1.10	2.02	1.99	1.06	.97	1.30	1.05	.96	4.16	1.11	.95	.94	.91	1.95
13	114	.76	1.70	.93	.91	.75	1.27	1.34	.00	3.86	.93	1.11	.91	.45	1.36
14	116	1.33	1.91	1.09	1.07	.74	2.51	.02	1.59	3.59	1.70	2.15	1.95	1.36	1.49
15	118	1.02	1.65	1.47	1.05	.69	1.61	1.12	.06	4.05	1.51	1.21	1.07	.04	1.24
16	125	.04	1.17	1.32	.92	.76	1.09	1.62	.61	.60	1.16	.70	.90	.07	1.44
17	126	1.29	1.99	2.00	1.19	1.34	.96	2.05	1.16	4.59	1.27	1.10	1.02	.75	2.06
18	192	.04	1.63	1.51	.06	.77	1.32	1.40	.52	4.17	1.16	1.17	1.09	.07	1.40
19	310	.97	1.93	2.04	.97	1.10	.90	1.64	.90	3.46	.60	.90	.02	.72	1.76
20	320	2.49	2.53	2.75	2.51	1.98	2.50	1.56	2.32	5.41	2.43	2.45	2.56	2.44	2.15
21	330	.06	1.43	1.54	.94	.53	1.30	1.23	.47	4.27	1.17	.05	.01	.71	1.30
22	340	.71	1.92	.97	1.16	.05	1.60	1.02	1.02	3.40	1.35	1.43	1.35	.59	.93
23	31039	1.00	1.26	1.75	1.16	1.12	1.16	1.71	.97	4.75	1.37	1.03	1.20	1.16	1.70
24	10060	.00	1.70	1.51	.97	1.01	1.50	1.46	.05	3.51	1.02	1.40	.05	.75	1.26
25	20073	1.21	1.17	1.94	1.19	1.15	1.23	1.69	1.17	4.02	1.39	1.22	1.20	.97	1.44
26	30121	.94	1.61	2.00	1.13	.05	1.22	1.54	.76	3.93	.74	1.24	1.13	.54	1.39
27	30122	.34	1.39	1.46	.02	.03	1.36	1.29	.90	3.40	1.40	1.20	1.38	1.09	1.42
28	30130	.64	1.67	1.32	.74	.01	1.26	1.20	.41	3.73	1.26	.90	1.00	.74	1.31
29	30100	.44	1.00	1.22	.04	.09	1.16	1.30	.09	3.40	1.23	1.12	1.17	.60	1.30
30	30200	.50	1.92	1.62	.95	.05	.90	1.44	1.07	5.22	1.20	.05	1.04	.05	1.06
31	30000	.00	2.00	1.65	1.14	1.12	1.25	1.05	1.22	.90	1.65	1.20	1.49	1.16	1.01
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10060	20073	30121	30122	30130	30100	30200
LONGITUDE	-114.29	-75.92	-97.73	-60.81	-93.08	-119.07	-150.00	-105.12	-14.60	144.61	-70.42	-57.61	33.73	-150.00	-70.05
LATITUDE	50.87	45.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	.04	1.29	.04	.97	2.49	.06	.71	1.00	.00	1.21	.94	.34	.64	.44
2	19	1.17	1.99	1.63	1.93	2.53	1.43	1.92	1.26	1.70	1.17	1.61	1.39	1.47	1.00
3	127	1.32	2.00	1.51	2.04	2.75	1.54	.97	1.75	1.53	1.94	2.00	1.44	1.32	1.22
4	21	.92	1.19	.06	.97	2.51	.94	1.16	1.16	.97	1.19	1.13	.02	.74	.04
5	31061	.76	1.34	.77	1.10	1.90	.53	.05	1.12	1.01	1.15	.05	.03	.01	.09
6	23	1.05	.96	1.32	.90	2.50	1.30	1.60	1.16	1.50	1.23	1.22	1.36	1.26	1.16
7	24	1.62	2.05	1.40	1.64	1.56	1.23	1.02	1.71	1.46	1.69	1.54	1.29	1.20	1.30
8	27	.61	1.16	.52	.90	2.32	.47	1.02	.97	.05	1.17	.76	.90	.41	.09
9	30682	.65	4.59	4.17	3.46	5.41	4.27	3.40	4.75	3.51	4.02	3.93	3.40	3.73	3.44
10	107	1.16	1.27	1.16	.60	2.43	1.17	1.35	1.37	1.82	1.39	.74	1.40	1.26	1.23
11	112	.74	1.10	1.17	.90	2.45	.05	1.43	1.40	1.22	1.24	1.20	.90	1.12	.05
12	113	.90	1.02	1.09	.02	2.56	.01	1.35	1.20	.05	1.20	1.13	1.30	1.00	1.17
13	114	.07	.75	.07	.72	2.44	.71	.59	1.16	.75	.97	.54	1.09	.74	.60
14	116	1.44	2.06	1.40	1.76	2.15	1.30	.93	1.70	1.26	1.44	1.39	1.42	1.31	1.30
15	118	1.05	1.15	.97	1.27	2.30	.50	1.10	.96	.91	.90	1.17	1.25	.91	1.01
16	125	.61	1.17	.94	.76	1.90	.50	.97	.66	.09	.71	.69	.63	.60	.04
17	126	1.17	.97	1.16	.90	3.08	1.11	1.40	1.09	1.24	1.16	.97	1.60	1.15	1.19
18	192	.94	1.16	.63	1.00	2.39	.74	1.20	1.06	.92	1.26	.60	.96	.60	1.01
19	310	.76	.90	1.00	.85	2.30	.91	1.20	1.19	.90	1.12	.72	1.13	.94	1.03
20	320	1.90	3.00	2.39	2.30	2.41	2.13	2.54	2.33	2.53	2.63	2.47	1.90	2.32	2.61
21	330	.50	1.11	.74	.91	2.13	.59	1.11	.00	.02	.07	.00	1.00	.50	1.00
22	340	.97	1.40	1.20	1.20	2.54	1.11	.03	1.41	.05	1.42	1.34	.96	.95	.51
23	31039	.66	1.09	1.06	1.19	2.33	.00	1.41	.94	1.21	.94	1.01	1.36	1.07	1.17
24	10060	.09	1.24	.92	.90	2.53	.02	.05	1.21	.69	1.10	.90	1.03	.02	.01
25	20073	.71	1.16	1.26	1.12	2.63	.07	1.42	.94	1.10	1.00	.00	1.30	1.00	1.20
26	30121	.60	.97	.60	.72	2.47	.00	1.34	1.01	.90	.00	.70	1.07	.04	1.13
27	30122	.63	1.60	.96	1.13	1.90	1.00	.96	1.36	1.03	1.30	1.07	.70	.67	.70
28	30130	.60	1.15	.60	.94	2.32	.50	.95	1.07	.02	1.00	.04	.67	.55	.02
29	30100	.04	1.19	1.01	1.03	2.61	1.00	.51	1.17	.01	1.20	1.13	.70	.02	.63
30	30200	.09	1.22	1.15	1.02	2.60	.07	.94	.79	1.09	1.13	1.13	.74	1.03	.61
31	30000	1.26	1.46	1.15	1.45	3.10	1.30	1.30	1.55	1.36	1.30	1.37	.59	1.13	1.00

Table 2F. Latitude Residuals Meters, Semi Short Arc/1 Rev Fit

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	0	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-15.37	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	138.65	-106.75	-149.83	-1.38	-64.76
LATITUDE	-23.22	-77.85	52.73	50.80	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.18	76.54
1	9	.55	1.43	1.03	.80	1.18	1.17	1.23	.64	.72	1.08	.67	1.13	.71	1.00
2	19	1.43	1.48	1.53	1.41	1.62	1.74	2.15	1.47	1.12	2.12	1.49	1.92	1.56	1.92
3	127	1.03	1.53	1.03	1.10	.61	1.64	1.60	1.01	1.66	1.36	1.25	1.49	.82	.96
4	21	.80	1.41	1.10	.49	.78	.93	1.47	.68	.92	1.14	.82	.95	.63	1.13
5	31061	.18	1.62	.61	.78	.50	1.08	1.15	.51	1.42	1.41	.73	.90	.44	.75
6	23	1.17	1.74	1.64	.93	1.09	.40	1.57	1.10	.73	1.13	.74	1.02	.81	1.49
7	24	1.23	2.15	1.60	1.47	1.15	1.57	1.44	1.54	2.44	2.09	1.33	1.62	1.46	1.94
8	27	.64	1.47	1.61	.68	.51	1.10	1.54	.41	1.21	1.14	.70	.76	.51	1.04
9	30682	.72	1.12	1.96	.92	1.42	.73	2.44	1.21	.84	.42	.75	.95	1.12	1.28
10	107	1.08	2.12	1.36	1.14	1.41	1.13	2.09	1.14	.42	.96	1.23	1.22	.99	1.32
11	112	.67	1.49	1.25	.82	.73	.79	1.33	.70	.75	1.23	.57	.91	.73	1.38
12	113	1.13	1.92	1.49	.95	.90	1.02	1.62	.76	.95	1.22	.91	.71	.78	1.40
13	114	.71	1.56	.82	.63	.44	.81	1.46	.51	1.12	.99	.73	.78	.44	.88
14	116	1.00	1.92	.96	1.13	.75	1.49	1.94	1.04	1.28	1.32	1.38	1.40	.88	1.12
15	118	.96	1.45	1.02	.86	.68	1.35	1.61	.80	1.54	1.52	.97	1.08	.82	1.16
16	125	.72	1.01	1.17	.74	.67	.99	1.66	.59	.69	1.22	.57	1.02	.68	.74
17	128	1.57	1.85	1.73	1.20	1.22	.97	2.10	1.22	.76	1.43	1.22	.95	.98	1.43
18	192	.95	1.58	1.04	.76	.78	1.65	1.68	.82	1.00	1.17	.92	1.10	.66	1.19
19	310	.82	1.82	1.36	.68	1.05	.71	1.53	.82	.36	.72	.78	.89	.68	1.05
20	320	1.95	2.41	1.75	2.22	1.86	2.40	1.89	2.23	3.04	2.59	2.15	2.49	2.17	1.95
21	330	.74	1.25	.87	.84	.57	1.15	1.44	.44	1.35	1.40	.72	.94	.59	1.11
22	340	1.06	1.88	.95	1.13	.85	1.43	1.53	.97	1.28	1.37	1.17	1.20	1.04	.50
23	31039	.71	1.10	1.37	.94	1.22	1.37	2.04	1.07	.49	1.40	.96	1.34	1.13	1.54
24	10068	.81	1.49	1.20	.73	.90	1.27	1.76	.43	.75	1.01	.96	.67	.79	1.13
25	20073	.94	1.57	1.73	.97	1.22	1.12	2.06	.99	.85	1.16	1.07	1.24	1.11	1.36
26	30121	.70	1.77	1.23	.81	.93	.81	2.01	.81	.68	.71	.89	1.08	3.40	.95
27	30122	.38	1.74	1.23	.81	.49	1.02	1.29	.76	.99	1.02	.70	1.09	.79	.99
28	30130	.65	1.34	1.03	.63	.77	.86	1.64	.43	.72	.97	.66	.94	.49	1.11
29	30188	.85	1.75	1.09	.73	.93	1.02	1.32	.87	.77	1.21	.79	1.00	.81	.86
30	30280	.96	1.97	1.64	.93	1.16	.49	1.38	1.12	0.00	.97	.88	1.09	.94	1.26
31	30800	1.49	2.06	1.89	1.22	1.13	.80	1.69	1.50	.95	1.64	1.29	1.44	1.25	1.62
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30280
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-158.00	-70.85
LATITUDE	50.87	45.40	30.38	44.46	44.73	34.11	21.52	69.12	-7.91	-90.00	-10	-25.30	35.00	21.31	-33.62
1	9	.72	1.57	.95	.82	1.95	.74	1.06	.71	.81	.94	.70	.38	.65	.85
2	19	1.01	1.85	1.58	1.82	2.41	1.25	1.88	1.10	1.49	1.57	1.77	1.74	1.34	1.75
3	127	1.17	1.73	1.04	1.36	1.75	.87	.95	1.37	1.20	1.73	1.23	1.23	1.03	1.09
4	21	.74	1.20	.76	.68	2.22	.64	1.13	.94	.73	.97	.81	.63	.73	.93
5	31061	.67	1.22	.78	1.05	1.86	.57	.85	1.22	.90	1.22	.63	.49	.77	.93
6	23	.99	.92	1.05	.71	2.40	1.15	1.43	1.37	1.27	1.12	.81	1.02	.86	1.02
7	24	1.66	2.10	1.68	1.53	1.89	1.44	1.53	2.04	1.76	2.06	2.01	1.29	1.64	1.32
8	27	.59	1.22	.82	.82	2.23	.44	.97	1.07	.43	.99	.81	.76	.43	.87
9	30682	.69	.76	1.00	.36	3.04	1.35	1.28	.49	.75	.85	.68	.99	.72	.77
10	107	1.22	1.43	1.17	.72	2.59	1.40	1.37	1.40	1.01	1.16	.71	1.02	.97	1.21
11	112	.57	1.22	.92	.78	2.15	.72	1.17	.96	.96	1.07	.89	.70	.66	.79
12	113	1.02	.95	1.10	.89	2.49	.94	1.20	1.34	.87	1.24	1.08	1.09	.94	1.00
13	114	.68	.98	.66	.68	2.17	.59	1.04	1.13	.79	1.11	3.40	.79	.49	.81
14	116	.74	1.43	1.19	1.05	1.95	1.11	.90	1.54	1.13	1.36	.95	.95	1.11	.86
15	118	.90	1.30	1.07	1.24	1.95	.54	1.14	.92	1.09	1.11	1.29	1.15	.94	.99
16	125	.58	1.26	.99	.77	1.85	.65	.83	.73	.76	.85	.61	.73	.51	.73
17	128	1.26	1.11	1.22	1.19	2.98	1.20	1.64	1.21	1.37	1.41	.89	1.65	1.12	1.40
18	192	.99	1.22	.63	.93	2.47	.80	1.30	1.19	.96	1.45	.64	1.01	.52	1.03
19	310	.77	1.19	.93	.60	2.39	1.04	1.06	1.21	.78	.97	.52	.63	.67	.68
20	320	1.85	2.98	2.47	2.39	2.22	2.05	1.70	2.18	2.34	2.51	2.49	2.00	2.35	1.92
21	330	.65	1.20	.80	1.04	2.05	.59	1.04	.99	.90	1.17	1.06	.97	.60	.93
22	340	.83	1.64	1.30	1.06	1.70	1.04	1.26	1.40	1.06	1.46	2.97	.97	1.13	.65
23	31039	.73	1.21	1.19	1.21	2.18	.99	1.40	.97	1.04	.97	1.17	1.25	.94	1.13
24	10068	.76	1.37	.96	.78	2.34	.90	1.06	1.04	.62	.89	.79	.83	.63	.94
25	20073	.85	1.41	1.45	.97	2.51	1.17	1.46	.97	.89	1.03	3.26	1.05	1.02	1.23
26	30121	.61	.89	.64	.52	2.49	1.04	2.97	1.17	.79	3.26	3.69	.67	.57	.89
27	30122	.73	1.65	1.01	.63	2.00	.97	.97	1.25	.83	1.05	.67	.62	.79	.71
28	30130	.51	1.12	.52	.67	2.35	.60	1.13	.94	.63	1.02	.57	.79	.37	.89
29	30188	.73	1.40	1.03	.68	1.92	.93	.65	1.13	.94	1.23	.89	.71	.89	.78
30	30280	.83	1.39	1.43	.65	2.22	1.21	1.20	.94	1.20	.67	.74	.79	1.15	.83
31	30800	1.54	1.34	1.25	1.19	2.92	1.39	1.91	1.76	1.67	1.28	1.26	1.15	1.26	1.44

Table 3A. Height Residuals Meters. Point Positions/Orbit Fixed

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-45.87	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	138.65	-106.75	-149.83	-1.38	-68.76
LATITUDE	-23.22	-77.85	52.73	50.80	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.18	76.34
1	8	.48	.58	.67	.82	.58	1.45	.93	.82	.88	.34	.75	.57	1.32	.89
2	19	.58	.64	.81	.81	.80	1.55	1.37	.84	.84	.60	.65	.76	1.62	.72
3	127	.67	.81	.30	.65	.32	.91	1.55	.86	.86	.66	.47	.77	.46	1.57
4	21	.82	.81	.65	.68	.40	.95	1.70	1.02	1.06	.96	.65	.70	.93	1.50
5	31061	.62	.80	.32	.40	.27	.45	1.28	.82	.86	.52	.37	.58	.52	1.39
6	23	.58	.64	.91	.99	.45	.67	1.23	1.43	.70	.66	.69	.62	.69	1.71
7	24	1.45	1.55	1.55	1.70	1.28	1.23	1.38	1.53	.92	1.02	1.33	1.77	1.91	2.13
8	27	.93	1.37	.86	1.02	.82	1.43	1.53	.93	1.48	1.05	.87	1.33	1.11	1.36
9	30682	.82	.84	.86	1.06	.86	.70	.92	1.48	.71	.55	.70	1.12	.63	1.70
10	107	.88	.84	.66	.96	.52	.66	1.02	1.05	.55	.63	.71	.94	.68	1.75
11	112	.34	.60	.47	.65	.37	.69	1.33	.87	.70	.71	.29	.73	.55	1.49
12	113	.75	.65	.77	.70	.58	.82	1.77	1.33	1.12	.94	.73	.65	.83	1.49
13	114	.57	.76	.46	.93	.52	.69	1.51	1.11	.63	.68	.55	.83	.44	1.32
14	116	1.52	1.62	1.57	1.50	1.39	1.71	2.13	1.36	1.70	1.75	1.49	1.49	1.52	1.50
15	118	.89	.72	.58	.92	.43	.98	1.72	1.18	.93	.85	.70	.68	.72	1.51
16	125	.71	1.09	.66	1.02	.70	.87	1.21	.76	.95	.69	.62	1.19	.70	2.00
17	128	.99	.98	1.17	1.19	.95	1.21	1.82	1.53	.24	1.39	1.01	1.03	1.26	1.85
18	192	.79	1.14	.88	1.10	1.06	1.07	1.40	1.22	.73	.97	.80	1.06	.89	1.63
19	310	.57	.85	.40	.91	.64	.87	1.55	.91	.78	.73	.57	.88	.46	1.60
20	320	.80	.83	.82	.94	.59	.75	1.09	2.13	.71	.89	.64	1.04	1.06	1.93
21	330	.48	.70	.65	.63	.44	.78	1.65	1.09	1.03	.91	.49	.64	.77	1.74
22	340	.74	.72	.81	.89	.41	.76	1.17	1.00	.51	.79	.61	.71	.97	1.89
23	31039	.72	.77	.49	.92	.52	.69	1.26	1.07	.62	.53	.62	.80	.61	1.63
24	10068	.82	.93	.66	.97	.37	.55	1.32	1.06	1.01	.66	.72	.92	.63	1.62
25	20073	.51	.68	.67	1.03	.73	.83	1.61	1.09	.85	.85	.57	.78	.58	1.60
26	30121	.50	.87	.57	.98	.52	.60	1.25	1.02	.47	.47	.46	.88	.54	1.63
27	30122	.76	.75	.69	.50	.39	.78	1.73	1.18	1.15	.87	.59	.47	.86	1.67
28	30130	1.03	.90	.78	1.27	.74	.99	1.23	1.18	.36	.70	.88	1.05	.83	1.66
29	30188	.45	.51	.78	.89	.78	.41	1.41	1.29	.90	.67	.58	.80	.60	1.91
30	30280	.55	1.00	.68	.74	.37	.91	1.61	.69	.55	.97	.44	.73	.68	1.20
31	30800	.78	.78	.59	.78	.34	.61	1.31	1.07	.73	.72	.58	.75	.67	1.29
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30280
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-76.42	-57.61	33.73	-158.00	-70.85
LATITUDE	50.87	45.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	.71	.99	.79	.57	.80	.48	.74	.72	.82	.51	.50	.76	1.03	.45
2	19	1.09	.98	1.14	.85	.83	.70	.72	.77	.93	.68	.87	.75	.90	1.00
3	127	.66	1.17	.88	.40	.82	.65	.81	.49	.86	.67	.57	.69	.78	.68
4	21	1.02	1.19	1.10	.91	.94	.63	.89	.92	.97	1.03	.98	.50	1.27	.89
5	31061	.70	.95	1.06	.64	.55	.44	.41	.52	.37	.73	.52	.39	.74	.78
6	23	.87	1.21	1.07	.87	.75	.78	.76	.69	.55	.83	.60	.78	.99	.41
7	24	1.21	1.82	1.40	1.55	1.09	1.65	1.17	1.26	1.32	1.61	1.25	1.73	1.23	1.41
8	27	.76	1.53	1.22	.91	1.13	1.09	1.00	1.07	1.06	1.09	1.02	1.18	1.29	.69
9	30682	.95	.24	.73	.78	.71	1.03	.51	.62	1.01	.85	.47	1.15	.36	.90
10	107	.69	1.39	.97	.73	.89	.91	.79	.53	.66	.85	.47	.87	.70	.67
11	112	.62	1.01	.80	.57	.64	.49	.61	.62	.72	.57	.46	.59	.88	.58
12	113	1.19	1.03	1.06	.88	1.04	.64	.71	.80	.92	.78	.88	.47	1.05	.80
13	114	.70	1.26	.85	.46	1.06	.77	.97	.61	.83	.58	.54	.86	.83	.60
14	116	2.00	1.85	1.63	1.60	1.93	1.74	1.89	1.63	1.62	1.60	1.63	1.67	1.66	1.91
15	118	.90	1.09	.93	.71	.89	.77	.74	.84	.75	.69	.57	.56	.70	.80
16	125	.63	1.30	.98	.63	.83	.82	.84	.74	.76	.85	.71	.93	.93	.80
17	128	1.30	1.02	.90	1.05	1.01	.85	.81	1.08	1.53	1.06	.96	1.17	1.27	1.12
18	192	.98	.90	.73	.75	1.05	.95	.89	.75	1.08	.89	.64	1.03	.91	1.04
19	310	.63	1.05	.75	.43	.90	.64	.80	.43	.77	.52	.48	.90	.71	.79
20	320	.83	1.01	1.05	.90	.69	.77	.55	.75	.93	.92	.89	.81	.91	.87
21	330	.82	.85	.95	.64	.77	.50	.54	.70	.93	.58	.65	1.08	.66	.63
22	340	.84	.81	.89	.80	.55	.54	.63	.64	1.02	.71	.69	.67	.89	.70
23	31039	.74	1.08	.75	.43	.75	.70	.64	.42	.71	.59	.44	.79	.48	.74
24	10068	.76	1.53	1.08	.77	.93	.93	1.02	.71	.63	.90	.76	.75	.85	.75
25	20073	.85	1.06	.89	.52	.92	.58	.71	.59	.90	.49	.47	.83	.76	.75
26	30121	.71	.96	.64	.48	.89	.65	.69	.44	.76	.47	.38	.76	.54	.72
27	30122	.93	1.17	1.03	.90	.81	.52	.67	.79	.75	.83	.76	.53	1.12	.79
28	30130	.93	1.27	.91	.71	.91	1.08	.89	.48	.85	.76	.54	1.12	.73	1.00
29	30188	.80	1.12	1.04	.79	.87	.66	.70	.74	.75	.75	.72	.79	1.00	.61
30	30280	.74	1.17	.68	.77	1.07	.63	.85	.95	.78	.75	.46	.57	1.25	.70
31	30800	.89	1.32	.79	.77	.74	.63	.89	.62	.51	.80	.57	.56	.84	.84

Table 3B. Height Residuals Meters. Point Positions/Orbit Relaxed

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118	119
LONGITUDE	-45.47	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	136.65	-106.75	-149.63	-1.38	-68.76
LATITUDE	-23.22	-77.85	52.73	50.40	30.34	13.44	-14.33	39.14	39.00	39.00	-34.67	32.28	61.28	51.18	76.54
1	4	.52	1.84	.67	.97	.72	1.00	1.37	1.02	.59	.56	.48	.51	.66	1.40
2	19	1.44	1.34	1.43	2.13	1.18	1.57	2.67	2.45	.79	1.57	1.70	1.66	1.34	1.78
3	127	.67	1.93	.39	.73	.61	.94	1.84	.86	1.06	.59	.38	1.01	.60	1.58
4	21	.97	2.13	.73	.41	.58	1.06	2.00	.97	1.31	1.03	.71	.67	1.01	1.55
5	31061	.72	1.18	.61	.58	.36	.57	1.46	.86	1.04	.59	.35	.65	.53	1.65
6	23	1.00	1.57	.94	1.04	.57	.71	1.84	1.40	.43	.62	.67	1.04	.73	1.66
7	24	1.87	2.67	1.84	2.60	1.44	1.49	1.76	1.76	1.34	1.93	1.75	2.00	1.89	2.00
8	27	1.02	2.45	.86	.97	.86	1.40	1.76	1.03	1.73	1.22	.98	1.42	1.31	1.89
9	30682	.59	.79	1.06	1.31	1.04	.83	1.34	1.73	.76	.78	.90	1.10	.54	1.65
10	107	.59	1.57	.59	1.03	.59	.62	1.93	1.22	.78	.36	.37	.96	.47	1.69
11	112	.48	1.70	.39	.71	.35	.67	1.75	.98	.90	.37	.23	.78	.48	1.56
12	113	.91	1.88	1.01	.87	.65	1.04	2.00	1.42	1.10	.96	.78	.72	.73	1.80
13	114	.68	1.34	.60	1.01	.53	.73	1.39	1.31	.54	.47	.48	.73	.32	1.55
14	116	1.40	1.78	1.98	1.55	1.65	1.66	2.00	1.69	1.65	1.69	1.56	1.80	1.55	1.47
15	118	.75	1.44	.71	1.03	.33	.77	1.73	1.20	.94	.50	.54	.85	.52	1.31
16	119	.40	1.79	.46	.84	.54	.76	1.84	.99	.77	.37	.24	.78	.49	1.63
17	128	.96	1.95	1.20	1.08	1.01	1.17	1.94	1.65	1.34	1.11	.99	.81	1.03	2.10
18	192	1.01	1.97	.98	1.08	1.04	1.15	2.23	1.48	1.07	.94	.84	1.08	.88	2.02
19	310	.72	1.62	.51	.96	.85	1.15	2.01	.99	1.00	.71	.60	.79	.64	1.58
20	320	1.03	1.82	.79	1.03	.84	.84	1.66	1.22	.83	.60	.90	1.29	1.04	1.61
21	330	.52	1.73	.43	.73	.35	.88	1.75	1.04	.96	.55	.29	.64	.50	1.57
22	340	.77	1.95	.69	1.10	.89	.99	1.70	1.17	1.03	.86	.74	1.41	.98	1.67
23	31039	.74	1.62	.52	1.09	.90	.93	1.93	1.17	.80	.53	.57	1.07	.55	1.49
24	10068	.69	1.62	.72	.78	.33	.64	1.81	1.08	.88	.65	.52	.53	.56	1.58
25	20073	.41	.81	.83	1.25	.75	.98	1.79	1.26	.74	.55	.59	.84	.56	1.41
26	30121	.69	.99	.61	1.23	.72	.79	1.74	1.26	.50	.71	.67	1.05	.61	1.66
27	30122	.71	1.11	.63	.67	.16	.78	1.78	.98	1.12	.70	.44	.62	.54	1.63
28	30130	.77	1.54	.69	1.10	.79	.88	1.97	1.26	.37	.48	.70	.82	.52	1.48
29	30188	.58	1.97	1.25	1.39	.96	.97	2.04	1.54	1.17	.91	.97	.97	1.05	2.24
30	30240	.27	2.16	.83	.98	.76	1.21	2.01	.95	.40	.80	.64	.55	.88	1.01
31	30800	.87	1.62	.75	.95	.56	.48	1.84	1.22	.78	.63	.56	.97	.58	1.43
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30240
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-158.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-158.00	-70.85
LATITUDE	50.47	45.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-33.62
1	8	.40	.96	1.01	.72	1.03	.52	.77	.74	.69	.69	.71	.77	.58	.27
2	19	1.79	1.95	1.97	1.62	1.82	1.73	1.95	1.62	1.62	.81	.99	1.11	1.54	1.97
3	127	.46	1.20	.98	.51	.79	.43	.69	.52	.72	.83	.81	.63	.69	1.25
4	21	.64	1.08	1.08	.96	1.03	.73	1.10	1.09	.78	1.25	1.23	.67	1.10	1.39
5	31061	.54	1.01	1.04	.85	.64	.35	.89	.90	.33	.75	.72	.16	.79	.96
6	23	.76	1.17	1.15	1.15	.84	.88	.79	.93	.64	.98	.79	.78	.88	.97
7	24	1.84	1.94	2.23	2.01	1.60	1.75	1.70	1.93	1.81	1.79	1.74	1.78	1.97	2.04
8	27	.99	1.65	1.48	.99	1.22	1.04	1.17	1.17	1.08	1.27	1.26	.98	1.26	1.54
9	30682	.77	1.34	1.07	1.00	.83	.96	1.03	.80	.88	.74	.50	1.12	.37	1.17
10	107	.37	1.11	.94	.71	.80	.55	.80	.53	.65	.55	.71	.70	.48	.91
11	112	.24	.99	.84	.60	.80	.29	.74	.57	.52	.59	.67	.44	.70	.97
12	113	.73	.81	1.08	.79	1.29	.64	1.41	1.07	.53	.84	1.05	.62	.82	.97
13	114	.49	1.03	.84	.64	1.04	.50	.98	.55	.56	.56	.61	.54	.52	1.05
14	116	1.63	2.10	2.02	1.58	1.61	1.57	1.67	1.69	1.58	1.41	1.66	1.63	1.48	2.24
15	118	.65	.95	1.09	.77	.77	.57	1.00	.71	.61	.57	.76	.56	.69	1.04
16	119	.29	.86	.61	.54	.93	.40	.84	.47	.54	.59	.51	.52	.64	.88
17	128	.86	.99	.97	1.22	1.03	.93	1.34	1.14	.97	1.26	1.14	.97	1.09	1.19
18	192	.61	.97	.87	.89	1.33	.93	1.18	.73	1.03	1.20	.98	.92	1.06	1.25
19	310	.55	1.22	.89	.54	1.17	.52	.97	.56	.87	.77	1.02	.75	.69	1.20
20	320	.93	1.03	1.33	1.17	.83	.99	.76	1.00	1.00	1.09	1.24	1.10	1.03	1.37
21	330	.40	.95	.93	.52	.89	.32	.82	.86	.62	.57	.80	.49	.70	1.05
22	340	.84	1.34	1.18	.47	.76	.62	.83	.72	1.14	1.05	1.16	1.13	.97	1.34
23	31039	.47	1.14	.73	.56	1.00	.66	.72	.51	.86	.82	.78	.82	.64	1.22
24	10068	.54	.97	1.03	.87	1.00	.62	1.14	.86	.47	.83	.73	.39	.71	.96
25	20073	.49	1.26	1.20	.77	1.09	.57	1.05	.82	.83	.54	.71	.79	.83	.65
26	30121	.51	1.14	.94	1.02	1.24	.80	1.16	.78	.73	.71	.64	.70	.86	.96
27	30122	.57	.97	.92	.75	1.10	.49	1.13	.82	.39	.79	.70	.43	.86	.99
28	30130	.64	1.09	1.06	.69	1.03	.70	.97	.64	.71	.83	.86	.86	.58	1.11
29	30188	.88	1.19	1.25	1.20	1.37	1.05	1.54	1.22	.90	.85	.96	.99	1.11	.99
30	30240	.53	.74	.89	.80	1.12	.88	.93	.86	.75	.67	.59	.76	.90	.65
31	30800	.60	1.21	.86	.87	1.05	.76	1.02	.72	.64	.85	.67	.60	.80	1.34

Table 3C. Height Residuals Meters. Semi Short Arc/Max Gap = 30 Deg.

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	1	19	127	21	31061	23	24	27	30602	107	112	113	114	116	118
LONGITUDE	-45.87	166.67	174.14	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	138.65	-106.75	-109.03	-1.24	-68.76
LATITUDE	-23.22	-77.85	52.73	58.88	30.34	13.44	-14.33	39.14	39.88	39.88	-34.67	32.24	61.72	51.18	76.54
1	8	.59	1.49	.68	.83	1.15	1.23	1.95	.89	.33	.55	.91	.77	1.35	.67
2	19	1.89	1.55	1.96	2.12	1.57	1.31	2.68	2.33	.86	1.67	1.71	2.04	1.46	1.75
3	127	.62	1.96	.52	.48	.98	1.24	1.74	.37	.81	.69	.58	.86	.85	1.39
4	21	.83	2.12	.48	.78	.73	1.36	1.67	.63	.83	.55	.63	.78	1.84	1.48
5	31061	1.15	1.57	.98	.73	.88	1.13	1.52	1.89	1.28	1.87	.91	.36	1.21	1.62
6	23	1.23	1.31	1.24	1.36	1.13	.79	1.96	1.48	.73	.91	.85	1.28	.62	1.88
7	24	1.95	2.68	1.74	1.47	1.52	1.96	1.69	1.74	1.99	1.78	1.63	1.98	1.94	2.38
8	27	.89	2.33	.37	.63	1.89	1.48	1.74	.81	1.27	.78	.75	1.87	1.28	1.88
9	30602	.33	.86	.81	.83	1.28	.73	1.99	1.27	.58	.68	.65	1.27	.35	1.68
10	107	.55	1.67	.49	.55	1.87	.91	1.78	.78	.68	.26	.24	.93	.56	1.61
11	112	.55	1.71	.58	.63	.91	.85	1.63	.75	.65	.24	.23	.78	.54	1.57
12	113	.91	2.84	.86	.78	.36	1.28	1.98	1.87	1.27	.93	.78	.88	1.83	1.86
13	114	.77	1.46	.85	1.84	1.21	.62	1.94	1.28	.35	.56	.56	1.83	.37	1.95
14	116	1.35	1.75	1.39	1.48	1.62	1.88	2.38	1.28	1.68	1.61	1.57	1.86	1.55	1.47
15	118	.67	1.87	.64	.63	.71	1.19	1.55	.88	.78	.61	.52	.88	.79	1.17
16	125	.68	1.81	.77	.96	1.13	.87	1.72	.85	.88	.58	.45	.89	.51	1.82
17	128	.95	2.88	.95	1.13	1.52	1.56	2.82	.99	.65	1.86	1.86	1.54	1.25	1.88
18	192	1.15	1.91	1.89	.99	1.18	.99	1.55	1.85	.99	.98	.86	1.83	1.85	1.76
19	310	1.88	1.71	.71	.98	1.21	1.18	1.85	.83	.86	.73	.71	1.88	.68	1.61
20	328	.95	1.74	.77	.56	.75	1.32	1.59	1.85	.78	.58	.76	1.16	.94	1.67
21	338	.67	1.89	.55	.85	1.83	1.86	1.78	.74	.72	.59	.48	.77	.71	1.68
22	348	.81	2.81	1.23	1.11	1.26	1.38	1.83	1.48	1.14	1.83	.94	1.88	1.11	2.13
23	31039	.68	1.79	.51	.74	.98	1.14	1.45	.69	.45	.58	.48	.99	.74	1.21
24	18868	.74	1.68	.81	.87	.76	.82	1.84	1.88	.58	.57	.54	.78	.44	1.17
25	28873	.47	.85	.87	1.86	1.36	.76	1.96	1.18	.29	.44	.47	1.12	.67	1.44
26	38121	.67	.79	1.82	.99	1.13	.78	1.79	1.18	.62	.71	.62	1.17	.68	1.74
27	38122	.55	.94	.68	.76	.79	.88	1.61	.99	.55	.56	.49	.81	.59	1.36
28	38138	.95	1.67	.87	.94	1.88	.98	1.89	1.89	.42	.82	.75	.84	.59	1.56
29	38188	.65	1.85	1.34	1.29	1.48	1.83	2.85	1.58	1.86	.98	.88	1.18	.92	2.18
30	38288	.36	2.27	.78	.72	.97	1.46	1.88	.77	.68	.69	.64	.88	1.81	.94
31	38888	.97	1.63	.89	.94	1.81	.62	1.64	1.83	.68	.69	.57	1.82	.65	1.44
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	348	31039	18868	28873	38121	38122	38138	38188	38288
LONGITUDE	-114.29	-75.92	-97.73	-68.81	-93.88	-119.87	-158.88	185.12	-14.48	144.61	-78.42	-57.61	33.73	-158.88	-78.85
LATITUDE	58.87	45.48	38.38	44.48	44.73	34.11	21.52	69.12	-7.91	-98.88	-1.18	-25.38	35.88	21.31	-33.62
1	8	.68	.95	1.15	1.88	.95	.67	.81	.68	.74	.47	.55	.95	.65	.36
2	19	1.81	2.88	1.91	1.71	1.74	1.89	2.81	1.79	1.68	.85	.79	.94	1.67	1.85
3	127	.77	.95	1.89	.71	.77	.55	1.23	.51	.81	1.87	1.82	.68	.87	1.34
4	21	.96	1.13	.99	.94	.56	.85	1.11	.74	.87	1.86	.99	.76	.94	1.29
5	31061	1.13	1.52	1.18	1.21	.75	1.83	1.26	.98	.76	1.36	1.13	.79	1.88	1.48
6	23	.87	1.56	.99	1.18	1.32	1.86	1.38	1.14	.82	.76	.78	.88	.98	1.83
7	24	1.72	2.82	1.55	1.85	1.59	1.78	1.83	1.45	1.84	1.96	1.79	1.61	1.99	2.85
8	27	.85	.99	1.85	.83	1.85	.74	1.48	.69	1.88	1.18	1.14	.99	1.89	1.58
9	30602	.88	.65	.99	.86	.78	.72	1.14	.45	.58	.29	.62	.55	.42	1.86
10	107	.58	1.86	.98	.73	.58	.59	1.83	.58	.57	.64	.71	.56	.82	.98
11	112	.45	1.86	.86	.71	.76	.48	.94	.48	.54	.47	.62	.49	.75	.84
12	113	.89	1.54	1.83	1.88	1.16	.77	1.88	.99	.78	1.12	1.17	.81	.84	1.18
13	114	.51	1.25	1.85	.68	.94	.71	1.11	.74	.44	.47	.68	.59	.59	.92
14	116	1.82	1.38	1.76	1.61	1.67	1.68	2.13	1.21	1.17	1.44	1.74	1.36	1.56	2.18
15	118	.89	1.82	1.81	.84	.56	.73	.88	.37	.68	.72	.66	.43	.81	1.89
16	125	.58	1.28	.95	.78	1.87	.47	1.85	.72	.68	.58	.77	.76	.67	.76
17	128	1.28	1.83	1.36	1.88	1.85	1.83	1.43	.79	1.36	1.24	1.83	1.15	1.23	1.68
18	192	.95	1.36	.85	1.25	1.88	.87	1.23	.92	.79	1.25	.94	.78	.98	1.28
19	310	.78	1.86	1.25	.61	1.82	.73	1.25	.62	.98	.88	.96	.83	1.26	1.89
20	328	1.87	1.85	1.88	1.82	.73	1.86	.94	.68	.86	1.82	.68	.83	1.14	1.23
21	338	.47	1.83	.87	.73	1.86	.49	1.86	.52	.78	.71	.75	.61	.74	1.81
22	348	1.85	1.43	1.23	1.25	.94	1.86	.97	1.83	.98	.98	.59	.92	.98	.72
23	31039	.72	.79	.92	.62	.68	.52	1.83	.45	.76	.78	.63	.91	.84	1.21
24	18868	.68	1.36	.79	.98	.86	.78	.98	.76	.43	.76	.78	.67	.57	.89
25	28873	.58	1.24	1.25	.88	1.82	.71	.98	.78	.76	.68	.64	.67	.91	.78
26	38121	.77	1.83	.94	.96	.68	.75	.59	.63	.78	.64	.57	.63	.88	.76
27	38122	.76	1.15	.78	.96	.83	.61	.92	.51	.47	.67	.63	.43	.82	1.82
28	38138	.67	1.23	.98	.83	1.14	.74	.98	.84	.57	.91	.88	.82	.64	1.85
29	38188	.76	1.68	1.28	1.26	1.23	1.81	.72	1.21	.89	.78	.76	1.82	1.85	.91
30	38288	.78	1.81	.95	1.89	.92	.74	.72	.77	.76	.78	.35	.47	1.81	.73
31	38888	.71	1.35	.76	.94	1.13	.78	1.27	.83	.62	.74	.81	.65	.79	1.18

Table 3D. Height Residuals Meters. Semi Short Arc/Max Gap = 90 Deg.

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LONGITUDE	-45.07	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	130.65	-106.75	-109.83	-1.30	-60.76
LATITUDE	-23.22	-77.05	52.73	50.00	30.30	13.44	-14.33	39.14	39.00	39.00	-34.67	32.20	61.20	51.10	76.54
1	8	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
2	19	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
3	127	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
4	21	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
5	31061	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
6	23	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
7	24	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
8	27	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
9	30602	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
10	107	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
11	112	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
12	113	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
13	114	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
14	116	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
15	118	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
16	125	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
17	120	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
18	192	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
19	310	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
20	320	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
21	330	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
22	340	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
23	31039	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
24	10060	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
25	20073	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
26	30121	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
27	30122	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
28	30130	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
29	30100	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
30	30200	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
31	30000	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	120	192	310	320	330	340	31039	10060	20073	30121	30122	30130	30100	30200
LONGITUDE	-114.25	-75.92	-97.73	-60.01	-93.00	-119.07	-150.00	-105.12	-14.40	144.61	-70.42	-57.61	33.73	-150.00	-70.05
LATITUDE	50.07	45.40	30.30	44.40	44.73	36.11	21.52	69.12	-7.91	-90.00	-1.10	-25.30	35.00	21.31	-32.62
1	8	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
2	19	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
3	127	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
4	21	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
5	31061	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
6	23	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
7	24	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
8	27	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
9	30602	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
10	107	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
11	112	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
12	113	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
13	114	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
14	116	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
15	118	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
16	125	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
17	120	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
18	192	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
19	310	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
20	320	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
21	330	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
22	340	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
23	31039	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
24	10060	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
25	20073	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
26	30121	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
27	30122	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
28	30130	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
29	30100	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
30	30200	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
31	30000	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04

Table 3E. Height Residuals Meters. Semi Short Arc/90 Deg. 6 Par

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-45.87	166.67	174.18	4.36	-97.73	144.63	-179.72	141.13	-77.31	-77.31	138.65	-186.75	-149.83	-1.38	-68.76
LATITUDE	-23.22	-77.85	52.73	50.80	38.38	13.44	-14.33	39.14	39.80	39.80	-34.67	32.28	61.28	51.18	78.54
1	8	.99	1.99	1.82	1.31	1.16	1.44	2.15	.92	.91	1.14	1.11	1.13	.99	1.31
2	19	1.99	1.40	1.78	2.23	1.22	1.22	1.69	1.93	1.25	1.67	1.48	1.88	1.36	2.31
3	127	1.02	1.78	.35	.98	.79	1.37	1.77	.37	.25	.46	.65	1.82	.58	1.42
4	21	1.31	2.23	.90	.98	.97	1.54	2.28	.93	.67	.98	1.16	1.83	1.24	1.85
5	31061	1.16	1.22	.79	.97	.59	1.10	1.75	.74	.66	.60	.48	.61	.77	1.62
6	23	1.44	1.22	1.37	1.54	1.18	1.84	1.75	1.49	.86	1.21	.97	1.89	.96	1.91
7	24	2.15	1.69	1.77	2.28	1.75	1.75	1.74	1.91	1.38	1.70	1.79	2.17	1.72	2.38
8	27	.92	1.93	.37	.93	.74	1.49	1.91	.53	.38	.39	.69	.99	.74	1.18
9	30682	.91	1.25	.25	.67	.86	.86	1.38	.38	.24	.54	.71	1.83	.52	1.53
10	107	1.14	1.67	.46	.98	.68	1.21	1.78	.39	.54	.69	.48	.69	.73	1.62
11	112	1.11	1.40	.65	1.16	.48	.97	1.79	.69	.71	.48	.41	.74	.54	1.88
12	113	1.13	1.80	1.02	1.83	.61	1.89	2.17	.99	1.83	.89	.74	.81	.88	1.78
13	114	.99	1.36	.58	1.24	.77	.96	1.72	.74	.52	.73	.54	.88	.36	1.59
14	116	1.31	2.31	1.42	1.85	1.62	1.91	2.38	1.18	1.53	1.62	1.88	1.78	1.59	1.47
15	118	1.46	1.73	.86	1.28	.58	1.48	2.84	.68	.78	.85	.69	.89	.62	1.39
16	125	.52	1.78	.58	1.83	.82	1.89	1.94	.58	.58	.55	.48	.69	.58	1.56
17	128	1.82	1.81	.58	1.28	.95	1.38	2.85	.48	.44	.76	.76	.81	.53	1.53
18	192	1.65	1.88	1.11	1.19	1.14	1.18	2.88	1.83	.89	1.18	.98	.93	.84	1.75
19	310	1.41	1.68	.67	1.18	.78	1.27	1.88	.68	.63	.52	.61	1.87	.76	1.57
20	328	1.16	1.54	.42	1.12	.76	1.34	1.66	.63	.48	.49	.67	1.86	.63	1.77
21	338	1.84	1.82	.67	1.87	.67	1.28	2.87	.57	.53	.89	.86	.65	.81	1.65
22	348	1.38	1.40	1.85	1.49	1.86	1.11	1.68	1.88	1.21	.98	.84	.83	.75	2.17
23	31039	1.41	1.65	.65	1.26	1.88	1.32	1.57	.78	.78	.78	.73	1.13	.78	1.79
24	18868	1.83	1.43	1.25	1.32	.74	.95	1.56	1.15	.48	1.28	.95	1.23	.85	1.15
25	28873	1.22	1.84	.46	1.55	.98	1.17	1.71	.92	.45	.94	.84	1.25	.71	1.75
26	38121	.56	.95	.81	1.33	.97	.78	1.69	.61	.37	.96	.71	1.26	.43	1.95
27	38122	.48	1.81	1.83	1.32	.92	1.12	1.89	1.81	.71	1.16	.86	1.23	.78	1.57
28	38138	1.13	1.52	.54	1.22	.74	1.26	1.83	.69	.45	.77	.69	.97	.34	1.48
29	38188	1.57	1.89	1.24	1.68	1.16	.82	1.52	1.11	1.22	1.89	.84	1.88	.86	2.18
30	38288	.96	1.97	.85	1.89	.97	1.34	2.84	.71	.35	.79	.88	1.85	.95	1.33
31	38888	.94	1.99	.88	.93	.89	1.35	1.96	.78	.92	.94	.98	1.17	.84	1.27
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	314	328	330	348	31039	18868	28873	38121	38122	38138	38188	38288
LONGITUDE	-114.29	-75.52	-97.73	-68.01	-93.88	-119.87	-158.88	-105.12	-14.48	144.61	-78.42	-57.61	33.73	-158.88	-78.85
LATITUDE	58.87	45.48	38.38	44.40	44.71	34.11	21.52	69.12	-7.91	-98.88	-1.18	-25.38	35.88	21.31	-35.62
1	8	.53	1.82	1.65	1.41	1.16	1.84	1.38	1.41	1.83	1.22	.56	.48	1.13	1.57
2	19	1.73	1.81	1.88	1.68	1.54	1.82	1.48	1.65	1.43	1.84	.95	1.81	1.52	1.89
3	127	.58	.58	1.11	.67	.42	.67	1.05	.65	1.25	.86	.81	1.83	.54	1.24
4	21	1.83	1.28	1.19	1.10	1.12	1.87	1.49	1.26	1.32	1.55	1.33	1.32	1.22	1.68
5	31061	.82	.95	1.14	.78	.76	.67	1.06	1.08	.74	.98	.97	.92	.74	1.16
6	23	1.89	1.38	1.18	1.27	1.34	1.28	1.11	1.32	.95	1.17	.78	1.12	1.26	.82
7	24	1.94	2.85	2.88	1.88	1.66	2.87	1.68	1.57	1.56	1.71	1.69	1.89	1.83	1.52
8	27	.54	.48	1.83	.68	.63	.57	1.88	.78	1.15	.92	.61	1.81	.69	1.11
9	30682	.50	.44	.89	.63	.48	.53	1.21	.78	.48	.45	.37	.71	.45	1.22
10	107	.55	.76	1.10	.52	.49	.69	.98	.78	1.28	.94	.96	1.16	.77	1.89
11	112	.44	.76	.98	.61	.67	.66	.84	.73	.95	.84	.71	.86	.69	.84
12	113	.69	.81	.93	1.87	1.86	.65	.83	1.13	1.23	1.25	1.26	1.23	.97	1.88
13	114	.58	.53	.84	.76	.63	.61	.75	.78	.85	.71	.43	.78	.34	.86
14	116	1.56	1.53	1.75	1.57	1.77	1.65	2.17	1.79	1.15	1.75	1.55	1.57	1.48	2.18
15	118	.77	.81	.97	.89	.78	.78	.67	.85	.95	.94	1.51	1.46	.76	.98
16	125	.43	.66	.67	.86	.75	.35	.98	.69	1.88	.91	.36	.68	.88	.92
17	128	.66	.54	.99	.78	.72	.51	.99	.67	1.45	.98	.71	1.11	.45	1.32
18	192	.67	.99	.93	1.11	1.83	.75	1.13	.82	1.15	1.29	1.53	1.55	1.87	1.18
19	310	.86	.78	1.19	.62	.79	.93	1.21	.74	1.18	.89	1.11	1.37	.68	1.34
20	328	.75	.72	1.83	.79	.49	.71	.77	.62	1.21	.89	1.81	.96	.63	1.81
21	338	.35	.51	.75	.93	.71	.55	.87	.73	1.31	.93	.89	1.18	.74	1.88
22	348	.98	.99	1.13	1.21	.77	.87	.98	1.81	1.17	1.86	1.42	1.28	.94	.65
23	31039	.69	.67	.82	.74	.62	.73	1.81	.58	1.17	.84	1.18	1.29	.72	1.13
24	18868	1.88	1.45	1.15	1.18	1.21	1.31	1.17	1.17	1.13	1.89	1.84	1.99	1.21	1.86
25	28873	.91	.98	1.29	.89	.89	.93	1.86	.84	1.89	.78	1.24	1.18	.88	1.18
26	38121	.36	.71	1.53	1.11	1.81	.89	1.42	1.18	1.84	1.24	.78	.61	.76	1.61
27	38122	.68	1.11	1.55	1.37	.96	1.18	1.28	1.29	1.59	1.18	.61	.84	1.88	1.49
28	38138	.88	.45	1.87	.68	.63	.74	.94	.72	1.21	.88	.76	1.88	.45	1.26
29	38188	.92	1.32	1.18	1.34	1.81	1.88	.65	1.13	1.86	1.18	1.61	1.49	1.26	1.87
30	38288	.65	.86	1.46	1.88	.85	.89	1.18	1.16	1.71	1.11	.42	.45	1.83	1.36
31	38888	.94	1.85	1.24	.98	1.14	1.89	1.47	.97	1.36	1.25	1.85	.89	.97	1.66

Table 3F. Height Residuals Meters. Semi Short Arc/1 Rev Fit

STATION INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STATION NO	8	19	127	21	31061	23	24	27	30682	107	112	113	114	116	118
LONGITUDE	-44.87	166.67	174.10	4.36	-97.73	144.63	-170.72	141.13	-77.31	-77.31	138.65	-106.75	-149.83	-1.38	-68.76
LATITUDE	-23.72	-77.85	52.73	50.80	30.38	13.44	-14.33	39.14	39.00	39.00	-34.67	32.78	61.28	51.18	76.54
1	.82	1.95	.89	.98	1.27	1.47	2.25	.91	.34	1.07	1.03	1.16	.91	1.42	1.12
2	19	1.95	1.50	1.86	2.12	1.41	1.09	1.96	1.90	1.51	1.45	1.28	1.97	1.34	2.32
3	127	.99	1.86	.56	.74	.76	1.56	1.76	.41	.87	.72	.89	.81	.78	1.44
4	21	.98	2.12	.74	.81	.46	1.59	2.22	.85	.70	.91	.98	.69	1.04	1.32
5	31061	1.22	1.41	.76	.46	.53	1.17	1.57	.84	.54	.56	.73	.40	1.03	1.63
6	23	1.47	1.09	1.56	1.59	1.17	1.19	2.04	1.71	1.02	1.29	.94	1.55	.95	2.08
7	24	2.25	1.96	1.76	2.22	1.57	2.04	1.74	1.84	1.44	1.79	1.76	2.24	1.68	2.55
8	27	.91	1.90	.41	.85	.84	1.71	1.84	.59	1.03	.69	1.04	.94	.94	1.31
9	30682	.34	1.51	.87	.70	.54	1.02	1.44	1.03	.33	.59	.78	.44	.78	1.49
10	107	1.07	1.45	.72	.91	.56	1.29	1.79	.69	.59	.42	.55	.88	.81	1.80
11	112	1.03	1.28	.89	.98	.73	.94	1.76	1.04	.78	.55	.59	.91	.64	1.87
12	113	1.16	1.97	.81	.69	.40	1.55	2.24	.94	.44	.88	.91	.75	.94	1.65
13	114	.91	1.34	.78	1.04	1.03	.95	1.88	.94	.78	.81	.64	.94	.77	1.65
14	116	1.42	2.32	1.44	1.32	1.63	2.08	2.55	1.31	1.49	1.80	1.87	1.65	1.65	1.50
15	118	1.12	1.93	.83	.95	.32	1.79	2.09	.81	.50	.71	.91	.59	.99	1.50
16	125	.39	1.92	.42	.65	.64	1.47	1.98	.45	.70	.61	.85	.66	.80	1.25
17	128	.97	1.80	.97	1.15	.90	1.53	2.13	.63	.29	.80	1.03	.97	.92	1.71
18	192	1.50	2.04	1.17	1.18	1.19	1.59	2.10	1.08	.87	1.19	1.38	.96	1.14	1.81
19	310	1.10	1.62	.94	1.07	.83	1.36	1.91	.81	.70	.56	.83	1.09	1.00	1.82
20	320	1.08	1.49	.81	1.08	.62	1.47	1.74	.75	.63	.50	.81	1.07	.87	1.69
21	330	.86	2.04	.76	.78	.30	1.80	2.19	.69	.41	.82	1.07	.63	1.03	1.50
22	340	1.31	1.53	1.15	1.37	1.37	1.27	1.75	1.24	1.46	1.10	.79	1.18	.77	2.23
23	31039	1.08	1.75	.77	1.12	.93	1.48	1.56	.63	.59	.78	1.06	1.04	.94	1.78
24	10068	1.06	1.69	.91	.88	.93	1.18	1.87	1.07	.54	1.01	.87	1.10	.77	.95
25	20073	1.17	1.02	1.23	1.70	1.56	1.37	1.82	1.44	.46	1.40	1.24	1.66	1.16	1.75
26	30121	.60	1.05	.59	.82	.81	.90	1.83	.86	.61	.87	.71	.87	.56	1.47
27	30122	.94	1.23	.96	.75	.49	1.07	1.98	1.13	.26	.83	.71	.78	.83	1.48
28	30130	.85	1.53	.83	1.13	.79	1.35	1.88	.94	.19	.81	.80	.99	.70	1.45
29	30188	1.39	1.31	1.34	1.47	1.55	1.02	1.70	1.32	1.76	1.16	.84	1.45	.91	2.34
30	30260	.52	2.21	.82	.77	.86	1.86	2.16	.82	0.00	1.06	1.00	.86	1.04	1.21
31	30800	1.40	1.47	.91	.99	.50	1.15	1.49	.90	.48	.69	.88	1.00	.93	1.43
STATION INDEX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
STATION NO	125	128	192	310	320	330	340	31039	10068	20073	30121	30122	30130	30188	30260
LONGITUDE	-114.29	-75.92	-97.73	-68.01	-93.08	-119.07	-154.00	-105.12	-14.40	144.61	-78.42	-57.61	33.73	-158.00	-70.85
LATITUDE	50.87	45.40	30.38	44.40	44.73	34.11	21.52	69.12	-7.91	-90.00	-10	-25.30	35.00	21.31	-33.62
1	.39	.87	1.50	1.10	1.08	.86	1.31	1.08	1.06	1.17	.60	.94	.85	1.39	.52
2	19	1.92	1.80	2.04	1.62	1.49	2.04	1.53	1.75	1.69	1.02	1.05	1.23	1.53	1.31
3	127	.42	.97	1.17	.94	.81	.76	1.15	.77	.91	1.23	.59	.96	.83	1.34
4	21	.65	1.15	1.18	1.07	1.08	.78	1.37	1.12	.88	1.70	.82	.75	1.13	1.47
5	31061	.64	.90	1.19	.83	.62	.30	1.37	.93	.93	1.56	.81	.49	.79	1.55
6	23	1.47	1.93	1.59	1.36	1.47	1.80	1.27	1.48	1.18	1.37	.90	1.07	1.35	1.02
7	24	1.98	2.13	2.10	1.91	1.74	2.19	1.75	1.56	1.87	1.92	1.83	1.98	1.88	1.70
8	27	.45	.63	1.08	.81	.75	.69	1.24	.63	1.07	1.44	.86	1.13	.94	1.32
9	30682	.70	.79	.87	.70	.43	.41	1.46	.59	.54	.46	.61	.26	.19	1.76
10	107	.61	.80	1.19	.56	.50	.82	1.10	.78	1.01	1.40	.87	.83	.81	1.16
11	112	.85	1.03	1.38	.83	.81	1.07	.79	1.06	.87	1.24	.71	.71	.80	.84
12	113	.66	.97	.96	1.09	1.07	.63	1.18	1.04	1.10	1.66	.67	.78	.99	1.45
13	114	.80	.92	1.14	1.00	.87	1.03	.77	.94	.77	1.16	.56	.83	.70	.91
14	116	1.25	1.71	1.81	1.82	1.69	1.50	2.23	1.78	.95	1.75	1.47	1.48	1.45	2.34
15	118	.80	.71	1.15	.88	.62	.54	1.05	.91	1.14	1.47	.94	.90	.78	1.37
16	125	.41	.75	.98	.77	.79	.53	1.21	.68	.90	1.14	.23	.76	.79	1.30
17	128	.75	.63	1.03	.83	.86	.67	1.33	.56	1.31	1.44	.91	1.06	.81	1.53
18	192	.98	1.03	1.01	1.44	1.17	1.67	1.49	.87	1.32	2.06	1.33	1.16	1.41	1.62
19	310	.77	.83	1.44	.63	.95	.97	1.45	.88	1.18	1.23	1.02	1.07	.74	1.53
20	320	.79	.86	1.17	.95	.60	.88	1.09	.80	1.01	1.47	.89	.88	.94	1.12
21	330	.53	.67	1.07	.97	.88	.66	1.33	.84	1.22	1.48	.55	.88	.90	1.53
22	340	1.21	1.33	1.49	1.45	1.09	1.33	1.08	1.30	1.20	1.30	1.05	1.09	1.18	.61
23	31039	.68	.56	.87	.88	.80	.84	1.30	.56	1.15	1.38	1.01	.97	.93	1.38
24	10068	.90	1.31	1.32	1.18	1.01	1.27	1.20	1.15	.83	1.37	.69	.70	.82	1.23
25	20073	1.14	1.44	2.06	1.23	1.47	1.48	1.30	1.38	1.37	1.08	.93	1.40	.75	1.35
26	30121	.23	.91	1.33	1.02	.89	.55	1.05	1.01	.69	.93	.67	.54	.55	1.12
27	30122	.76	1.06	1.16	1.07	.98	.98	1.09	.97	.70	1.40	.54	.62	.89	1.17
28	30130	.79	.81	1.41	.74	.94	.90	1.18	.43	.92	.75	.55	.89	.58	1.37
29	30188	1.30	1.53	1.62	1.53	1.12	1.51	.61	1.38	1.23	1.35	1.12	1.17	1.37	1.11
30	30260	.37	.85	1.14	1.13	1.06	.96	1.17	.94	1.02	1.35	.32	.63	.86	1.36
31	30800	.82	1.12	1.00	.87	.86	1.13	1.44	.89	.89	1.60	.90	.72	1.03	1.43

APPENDIX D

SAMPLES OF NUMBER OF
PASSES OBSERVED

Table 4. Number of Passes-Days 178-184 Semi Short Arc/30 Deg. Max Gap

STA	PASS PAIRINGS																					
	STATIONS																					
	0	19	127	210	1061	23	24	270	0602	107	112	113	114	116	118	125	128	192	310	320	330	340
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127	0	0	15	0	0	4	0	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0
21	0	0	0	15	0	0	0	1	0	0	0	0	1	11	1	0	0	0	0	0	0	0
31061	0	0	0	0	14	0	0	0	5	9	0	7	6	0	0	6	1	12	5	11	5	0
23	0	0	0	4	0	12	0	11	0	0	0	0	2	0	1	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	5	1	0	11	0	19	0	0	0	4	1	2	9	0	0	0	0	0	0
30602	0	0	0	0	0	5	0	0	12	11	0	1	3	0	3	1	2	6	9	7	1	0
107	0	0	0	0	0	5	0	0	11	26	0	3	5	0	7	4	3	13	14	14	3	0
112	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	7	0	0	0	1	3	0	5	0	5	4	0	6	1	6	4	0
114	0	0	0	0	1	0	2	0	4	3	5	0	5	32	1	13	7	1	6	0	7	9
116	0	0	0	11	1	0	0	1	0	0	0	0	1	20	2	0	0	0	0	0	0	0
118	0	0	0	1	1	0	1	0	2	3	7	0	5	13	2	30	7	0	0	3	0	5
125	0	0	0	0	0	6	0	0	1	4	0	4	7	0	7	11	0	4	2	5	6	0
128	0	0	0	0	0	1	0	0	0	2	3	0	0	1	0	0	0	4	2	3	2	0
192	0	0	0	0	12	0	0	0	6	13	0	6	6	0	0	4	2	17	8	15	5	0
310	0	0	0	0	0	5	0	0	9	14	0	1	0	0	3	2	3	6	10	9	0	0
320	0	0	0	0	11	0	0	0	7	14	0	6	7	0	6	5	2	15	9	17	5	0
330	0	0	0	0	0	5	0	0	0	1	3	0	4	9	0	5	6	0	5	0	5	11
340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31039	0	0	0	0	0	7	0	0	0	4	9	0	2	4	1	7	5	2	9	6	10	3
10060	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20073	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30121	0	0	0	0	0	2	0	0	0	1	2	0	3	1	0	2	1	0	3	1	3	0
30122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30130	0	0	0	0	6	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0
30100	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	2
30200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30000	0	17	14	15	14	10	0	16	11	19	14	0	31	10	20	11	4	17	17	17	11	0

STA	19	127	21061	23	24	270602	107	112	113	114	116	118	125	128	192	310	320	330	340
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31061	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30602	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
118	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
128	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
192	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
310	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31039	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10060	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20073	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30121	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30122	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30000	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5. Number of Passes-Days 178-184 Semi Short Arc/90 Deg. Max Gap

PASS PAIRINGS																							
STA	STATIONS																						
	8	19	127	23	31061	23	24	27	30602	107	112	113	114	116	118	125	120	192	310	320	330	340	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	0	17	0	2	0	4	1	4	1	1	5	0	1	4	3	0	1	0	2	0	0	0	
127	0	4	15	7	0	4	4	5	1	1	5	0	0	12	6	1	0	0	1	0	0	3	
21	0	2	7	15	0	1	6	3	0	1	2	0	11	11	7	1	1	0	1	0	1	3	
31061	0	0	0	0	14	0	0	0	5	9	0	7	0	0	9	6	1	12	5	11	5	0	
23	0	4	0	1	0	12	0	11	2	3	9	0	2	5	5	0	1	0	3	0	0	0	
24	0	1	4	6	0	0	0	1	0	0	0	0	6	3	4	0	0	0	0	0	0	1	
27	0	4	5	3	0	11	1	10	2	3	12	0	4	0	7	0	1	0	3	0	0	0	
30602	0	1	1	0	5	2	0	2	12	11	3	1	3	1	7	1	2	6	9	7	1	0	
107	0	1	1	1	9	3	0	3	11	20	4	3	5	2	11	4	3	13	14	14	3	0	
112	0	5	5	2	0	9	0	12	3	4	15	0	3	7	6	0	2	0	5	0	0	0	
113	0	0	0	0	7	0	0	0	1	3	0	0	6	0	7	4	0	6	1	6	4	0	
114	0	1	3	11	0	2	6	4	3	5	3	6	32	10	15	0	1	0	0	7	10	4	
116	0	4	12	11	0	5	3	0	1	2	7	0	10	19	0	1	1	0	2	0	0	4	
118	0	3	6	7	9	5	4	7	7	11	6	7	15	0	30	0	0	10	0	10	7	2	
125	0	0	1	1	6	0	0	0	1	4	0	4	0	1	0	11	0	4	2	5	6	1	
120	0	1	0	1	1	1	0	1	2	3	2	0	1	1	0	0	4	2	3	2	0	0	
192	0	0	0	0	12	0	0	0	6	13	0	6	0	0	10	4	2	17	0	15	5	0	
310	0	2	1	1	5	3	0	3	9	14	5	1	0	0	2	0	2	0	10	9	0	0	
320	0	0	0	0	11	0	0	0	7	14	0	6	7	0	10	5	2	15	9	17	5	0	
330	0	0	3	1	5	0	0	0	1	3	0	4	10	0	7	6	0	5	0	5	11	0	
340	0	0	3	3	0	0	1	0	0	0	0	0	4	4	2	1	0	0	0	0	0	4	
31039	0	1	3	0	7	0	0	3	6	10	2	2	4	1	7	5	2	9	0	10	3	0	
10060	0	1	3	3	0	3	1	3	2	3	3	0	3	4	5	1	1	0	3	0	0	2	
20073	0	4	2	1	0	2	1	3	3	6	0	0	0	3	4	0	1	0	4	0	0	0	
30121	0	1	0	0	7	1	0	1	10	14	2	3	2	0	9	3	2	11	13	12	0	0	
30122	0	2	1	1	2	3	0	2	5	6	4	0	0	2	3	1	2	2	0	2	0	0	
30130	0	0	4	6	2	0	2	0	0	0	2	13	3	0	4	0	1	0	1	5	3		
30160	0	0	5	5	0	0	3	0	0	0	0	0	0	5	3	1	0	0	0	0	1	2	
30260	0	0	0	0	0	1	0	0	1	1	2	0	0	0	1	0	1	0	2	0	0	0	
30000	0	17	15	15	14	11	0	17	12	20	14	0	31	10	29	11	4	17	10	17	11	6	

310391006020073301213012230130301003020030000																
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	1	1	4	1	2	0	0	0	0	0	0	0	0	0	0	17
127	0	3	2	0	1	4	5	0	0	0	0	0	0	0	0	15
21	0	3	1	0	1	6	5	0	0	0	0	0	0	0	0	15
31061	7	0	0	7	2	2	0	0	0	0	0	0	0	0	0	14
23	0	3	2	1	3	0	0	0	1	11						
24	0	1	1	0	0	2	3	0	0	0						
27	3	3	3	1	2	0	0	0	0	17						
30602	6	2	3	10	5	0	0	1	12							
107	10	3	3	14	6	0	0	1	20							
112	2	3	4	2	4	0	0	2	14							
113	2	0	0	3	0	2	0	0	0							
114	4	3	3	2	0	13	0	0	31							
116	1	4	3	0	2	5	5	0	10							
118	7	5	4	9	3	0	3	1	29							
125	5	1	0	3	1	4	1	0	11							
120	2	1	1	2	2	0	0	1	4							
192	9	0	0	11	2	1	0	0	17							
310	0	3	4	13	0	0	0	2	10							
320	10	0	0	12	2	1	0	0	17							
330	3	0	0	0	0	5	1	0	11							
340	0	2	0	0	0	3	2	0	4							
31039	15	1	2	10	3	1	0	0	15							
10060	1	7	2	1	3	1	1	1	7							
20073	2	2	3	2	3	0	0	2	9							
30121	10	1	2	16	5	0	0	1	16							
30122	3	3	3	5	9	0	0	3	9							
30130	1	1	3	0	0	16	0	0	16							
30160	0	1	0	0	0	0	11	0	11							
30260	0	1	2	1	3	0	0	3	3							
30000	15	7	9	16	9	16	11	3	05							

Table 6. Number of Passes-Days 178-184 Semi Short Arc/1 Rev Fit

STA	STATIONS																				
	0	19	127	2131061	23	24	2730602	107	112	113	114	116	118	125	128	192	310	320	330	340	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	0	17	5	4	4	4	1	5	2	4	5	3	7	6	10	2	1	6	2	4	3
127	0	5	15	6	0	4	4	5	0	0	5	0	0	12	5	1	0	0	0	0	3
21	0	4	6	15	0	1	6	2	0	0	1	0	10	9	7	1	0	0	0	1	3
31061	0	4	0	0	13	0	0	0	5	9	1	7	0	0	0	6	1	11	5	10	5
23	0	4	4	1	0	12	0	10	1	3	9	0	2	5	4	0	1	0	4	0	0
24	0	1	4	6	0	0	0	1	0	0	0	6	3	4	0	0	0	0	0	0	1
27	0	5	5	2	0	10	1	10	3	5	13	0	4	0	7	0	2	0	7	0	0
30602	0	2	0	0	5	1	0	3	12	11	5	2	4	0	7	1	2	6	9	7	2
107	0	4	0	0	9	3	0	5	11	20	7	4	6	0	11	4	3	13	14	14	4
112	0	5	5	1	1	9	0	13	5	7	16	0	3	7	6	0	2	2	0	2	0
113	0	3	0	0	7	0	0	0	2	4	0	6	6	0	7	5	0	6	2	6	0
114	0	7	0	10	0	2	6	4	4	6	3	6	32	9	15	9	1	0	1	7	10
116	0	6	12	9	0	5	3	0	0	0	7	0	9	19	7	1	0	0	0	0	4
118	0	10	5	7	0	4	4	7	7	11	6	7	15	7	29	0	0	9	0	9	7
125	0	2	1	1	6	0	0	0	1	4	0	5	9	1	0	11	0	4	2	5	7
128	0	1	0	0	1	1	0	2	2	3	2	0	1	0	0	0	4	2	3	2	0
192	0	6	0	0	11	0	0	0	6	13	2	6	0	0	9	4	2	16	0	14	5
310	0	2	0	0	5	4	0	7	9	14	0	2	1	0	0	2	3	0	10	9	1
320	0	4	0	0	10	0	0	0	7	14	2	6	7	0	9	5	2	14	9	16	5
330	0	3	0	1	5	0	0	0	2	4	0	4	10	0	7	7	0	5	1	5	11
340	0	1	3	3	0	0	1	0	0	0	0	4	4	2	1	0	0	0	0	0	4
31039	0	5	0	0	7	0	0	3	6	10	4	3	5	1	7	5	2	9	0	10	4
10060	0	2	3	3	0	3	1	4	0	0	2	0	3	4	3	1	0	0	0	0	2
20073	0	4	2	2	1	2	1	2	2	3	5	1	1	4	4	0	1	3	4	3	1
30121	0	4	0	0	7	1	0	2	10	14	5	4	3	0	9	3	2	11	13	12	1
30122	0	2	1	0	2	4	0	6	5	6	5	1	1	0	4	1	2	2	0	2	1
30130	0	4	4	6	2	0	3	0	1	1	0	2	13	5	0	5	0	1	1	1	5
30100	0	1	5	5	0	0	3	0	0	0	0	0	5	3	1	0	0	0	0	1	2
30200	0	1	1	0	0	2	0	2	1	1	2	0	0	0	2	0	1	0	2	0	0
30000	0	17	14	15	13	10	0	16	12	20	14	0	31	17	20	11	4	16	10	16	11
310391006020073301213012230130301003020030000																					
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	5	2	4	4	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
127	0	3	2	0	1	4	5	1	1	1	1	1	1	1	1	1	1	1	1	1	
21	0	3	2	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	
31061	7	0	1	7	2	2	0	0	0	13											
23	0	3	2	1	4	0	0	0	2	10											
24	0	1	1	0	0	3	3	0	0	0											
27	3	4	2	2	6	0	0	0	2	16											
30602	6	0	2	10	5	1	0	1	12												
107	10	0	3	14	6	1	0	1	20												
112	4	2	5	5	5	0	0	2	14												
113	3	0	1	4	1	2	0	0	0												
114	5	3	1	3	1	13	0	0	31												
116	1	4	4	0	0	5	5	0	17												
118	7	3	4	9	4	0	3	2	20												
125	5	1	0	3	1	5	1	0	11												
128	2	0	1	2	2	0	0	1	4												
192	9	0	3	11	2	1	0	0	16												
310	0	0	4	13	0	1	0	2	10												
320	10	0	3	12	2	1	0	0	16												
330	4	0	0	1	1	5	1	0	11												
340	0	2	1	0	0	3	2	0	4												
31039	15	1	3	10	3	2	0	0	15												
10060	1	7	1	0	1	1	1	1	6												
20073	3	1	9	4	1	1	0	1	0												
30121	10	0	4	16	5	1	0	1	16												
30122	3	1	1	5	10	1	0	3	10												
30130	2	1	1	1	1	16	9	0	16												
30100	0	1	0	0	0	9	11	0	11												
30200	0	0	1	1	3	0	0	3	3												
30000	15	6	0	16	10	16	11	3	66												

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